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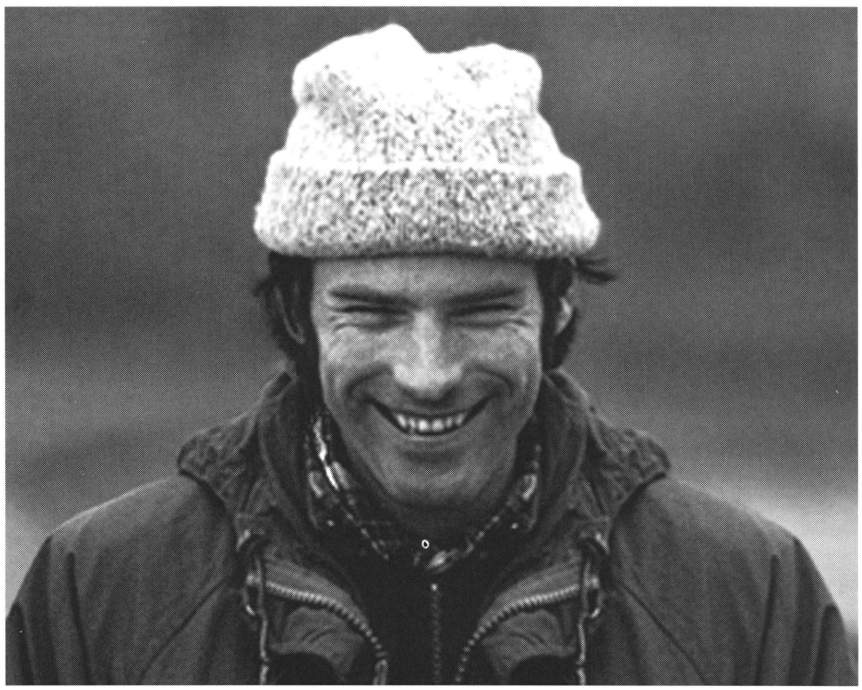

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The International Journal of Film and Electronic Production Techniques

June 1996 Vol. 77 No. 6

American Cinematographer

Features

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Departments

On Our Cover: A renegade spy (Tom Cruise) is drawn into a web of espionage as he infiltrates a CIA computer room in *Mission: Impossible*, an action-filled thriller directed by Brian DePalma and photographed by Stephen Burum, ASC (photo by Murray Close, courtesy of Paramount Pictures).

Contributing Authors:
Benjamin Bergery
Bob Fisher
Karen Kalish
Chris Probst
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American Cinematographer

June 1996 Vol. 77, No. 6

American **Cinematographer** (ISSN 0002-7928) established 1920 in 76th year of publication is published monthly in Hollywood by ASC Holding Corp., 1782 N. Orange Dr., Hollywood, CA 90028, U.S.A., 1-800-448-0145, 213-969-4333, Fax 213-876-4973. **Subscriptions:** U.S. $35; Canada/Mexico $50; all other foreign countries $60 a year (remit international Money Order or other exchange payable in U.S. $). **Advertising:** Rate card upon request from Hollywood Office. For **East Coast & Midwest sales (203) 761-9804, FAX (203) 761-0090, 387 Danbury Rd., Wilton, CT 06897.**

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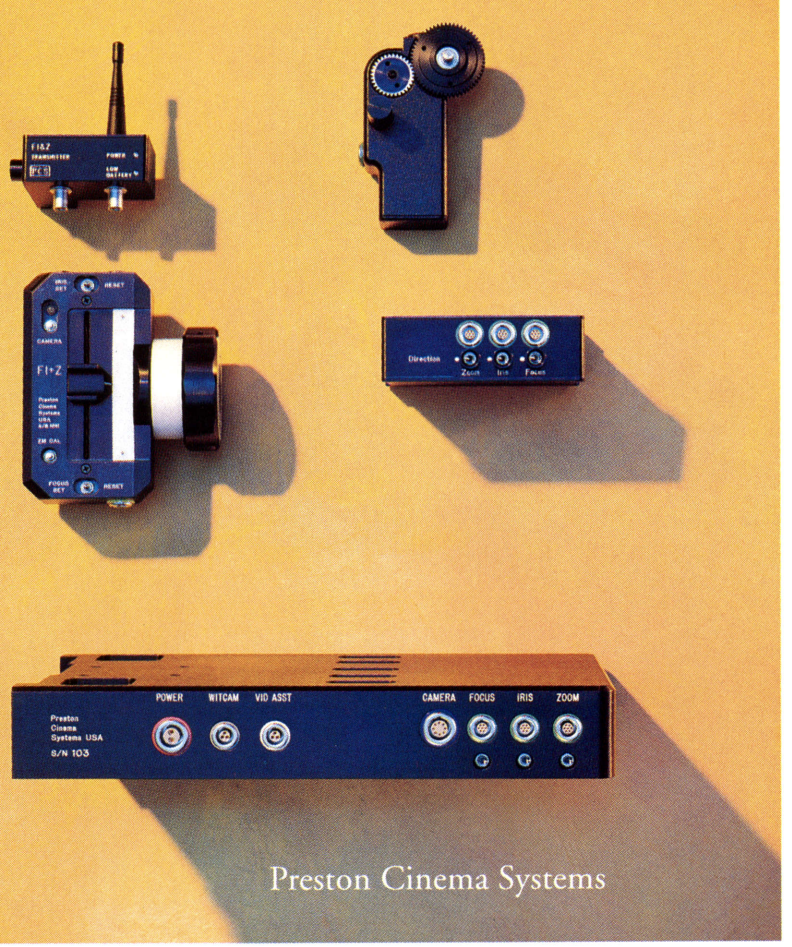

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In the big photo on this page, the lensboard is swung to its right. The unit is also shifted to its left. Shifting sideways is how you shoot head-on into a wall-mirror without seeing yourself.

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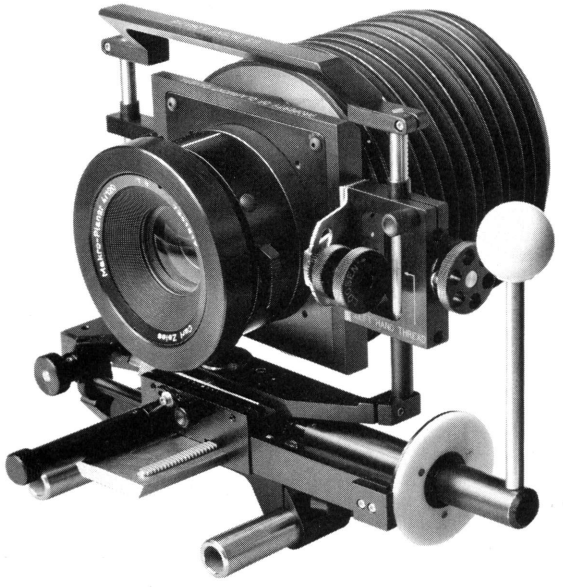

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Twelve lenses

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The last two are the macros.

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Video's Image-Quality Debate

by Frank Beacham

After being buffeted by the swift winds of change at this year's NAB in Las Vegas, it's no wonder that so many who make their living in video production are wondering what hit them. All but gone is the tried and true analog technology; the video of the future is made up of ones and zeroes. For many, being rooted in production rather than engineering has always held certain advantages. But these days even the engineers who provided the industry's foundation can't be relied upon to agree on much of anything, much less a clear sense of the future.

One perplexing issue that faced videomakers at the recent NAB was the debate over 4:1:1 and 4:2:2 digital video. What's the real difference, many wondered, between the much heralded 4:2:2 Studio Profile compression strategy, the digital studio production standard being pushed by Sony, and the 4:1:1 DV scheme, the standard used in the consumer DV format and for Panasonic's DVCPRO and Sony's DVCAM professional formats?

To many NAB attendees, the pictures made with the two formats looked pretty much the same. So why should one pay big bucks for 4:2:2 "studio grade" gear when you can get 4:1:1 DV gear at a fraction of the price? If the two standards look essentially the same, why not put the money into the programming, where it really counts?

To find out, we approached leading engineers on both sides of this issue. Peter Dare, senior vice-president of technology at Sony, said that in the mid-Eighties the broadcast industry decided that 4:2:2 should be the standard for digital television facilities. It was considered the best strategy in a compromise that weighed bandwidth against the maintenance of high-quality digital video throughout the broadcast chain.

The numbers deal with the ratio of how video parts are sampled when converted from analog to digital. The 4:2:2 means that for every four luminance samples taken, there are two red samples and two blue samples. The DV formats, however, use a 4:1:1 strategy; for every four luminance samples only one red and one blue sample is taken.

According to Dare, the difference between 4:2:2 and 4:1:1 has to do with how much chrominance, or color information, is in the video signal. The downside of 4:1:1, he says, is that some degradation of the color information occurs over multiple generations of editing and image processing. How serious this degradation is to total program quality seems to be a matter of opinion.

"On first generation there's probably very little difference in what you can see between 4:2:2 video and the digital consumer formats," says Dare. "But as the material is archived, passed through a DME, and undergoes some picture manipulation — all those things that happen in the real world — the 4:2:2 compression strategy holds up best. DVCAM doesn't necessarily stand up over multiple generations to the 4:2:2 standards when it comes to maintaining picture quality, resolution and proper colorimetry."

When Dare uses the term "4:2:2 compression strategy," he's referring to what Sony is calling 4:2:2 Studio Profile, a scheme that combines 4:2:2 sampling with MPEG video compression. 4:2:2 can also be used with other compression schemes. For example, Avid employs 4:2:2 with Motion JPEG compression. All the DV formats are 4:1:1 with a special 5-to-1 compression scheme designed for that format.

What differences between 4:2:2 compressed with MPEG and 4:1:1 compressed with DV will actually be seen in the picture? And are they so great that a viewer should really care?

Responds Dare, "Basically, you

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are asking, 'If I record 4:1:1, do my editing and send it off to a network, is that broadcast quality?' I would have to say to you in all honesty, 'Yes, it probably is.' Sitting at home with an NTSC television set, I suspect you couldn't tell the difference. If you could, it would be subtle."

However, warns Dare, in a scenario of digital television home transmission, one will perceive the difference in program material, especially heavily processed graphics. He suggests that one of the main considerations is how the standard-bearers will want programs to look in the post-NTSC era.

Panasonic, Sony's competitor, thinks that the entire 4:2:2 versus 4:1:1 issue is a diversion designed to scare people into staying with more expensive Betacam systems. "The people not talking about the differences between 4:2:2 and 4:1:1 are the people using 4:1:1. They are very happy people," says Steve Bonica, president of Panasonic Broadcast Television Systems Co.

Skirting a bunch of engineering terms, Bonica offers a rule of thumb for program producers to judge the quality differences between 4:2:2 and 4:1:1 systems. He says that if you are happy with the quality of Betacam SP, you will be happy with 4:1:1 DV because it is better in every way. In fact, he adds, Betacam SP is functionally equivalent to 4:1:1 quality video.

If you need image quality better than Betacam SP — for graphics work or very critical production — Bonica says that you should by all means use a digital component 4:2:2 system such as Panasonic's D-5 format or Sony's Digital Betacam. Otherwise, for field production, he thinks that 4:1:1 is just fine.

Stevan Vigneaux, Avid's senior marketing manager for broadcast products, emphasizes that neither sampling rates nor compression schemes have much to do with how good or bad most video pictures look.

"Compliance with standards is important, but it is not enough," he says. "If I shoot video with a maladjusted camera, the wrong filter or in poor lighting, I can record magnificent 4:2:2 video and it won't look as good as something that came off of a VHS deck.

"The question boils down to one thing," Vigneaux concludes. "Does the video look good enough for the application? That's all that really matters."

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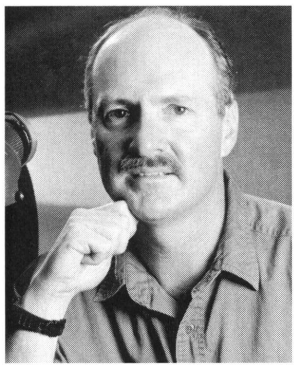

"This camera is rugged.

The 435 was hit by a car and knocked onto the sidewalk but we were able to continue shooting. Obviously, the camera body and internal components are extremely rugged."
William Bennett, *DP*

"Over a period of two months, I used the 435 ES on six commercial productions all around the US. I encountered many of the usual adverse conditions – rain, dust, cold, heat – you name it. But through it all the 435 performed flawlessly.

"On one shoot, the 435 camera system was mounted on a tripod for a stunt scene in downtown Los Angeles when it was accidentally struck by a car. The camera fell five feet, crashed onto the concrete sidewalk and slid twelve more feet.

"The mattebox was destroyed, but the only damage to the camera was a slight crack in the magazine! We replaced it with an Arriflex 35-3 type magazine and shot the rest of the night. All the footage, before and after the accident, was perfect!

"The day after the accident we tested the steadiness of the movement against a latent-image grid, pre-exposed on an optical printer using an Acme camera with a Bell and Howell 7709 type, fixed-registration pin movement. We took this latent-image film and exposed it a second time in the 435 ES with the grid rotated about 10°, so the two sets of grid lines would cross each other on the negative. Using a new 435 type magazine, we ran the camera at: 12, 24, 30 and 150 fps with a 180° shutter. In all cases the image was rock steady!"

"The viewfinder is very bright and sharp...
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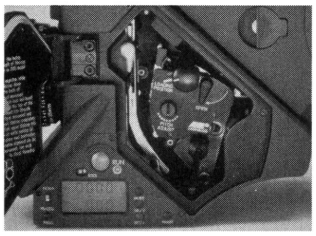

"The image is rock steady. *The 5 link movement with two registration and six transport pins provided a rock steady image at any forward or reverse speed, even tested against a latent-image grid pre-exposed on the film stock. I was impressed."*

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compiled by Andrew O. Thompson

Restoring *The King and I*

The restoration of classic films blighted either by improper storage or the aging process remains a specialty department offered by a mere handful of labs nationwide. When executives at Twentieth Century Fox found short rolls of outtake material from the 1956 film *The King and I*, the pool of available restoration labs was depleted even further. *The King and I* was shot on Cinemascope 55, a widescreen presentation system invented by Fox, and used only on two musicals (the other being *Carousel*) before it slid quickly into obsolescence. Crest National Videotape and Film Labs in Hollywood was the only facility with the ability to transfer 65mm and 70mm formats, but even they lacked the production support necessary to transfer 55mm. Nevertheless, Jon Truckenmiller, vice-president of engineering for Crest, and his team, which included colorist Ron Feneis, examined the footage, weighed the drawbacks and decided to tackle the project.

Truckenmiller became intrigued with the idea of a wide-format transfer system back in the Eighties, when he was approached by MGM to transfer a 70mm print of Michael Cimino's *Heaven's Gate* to video. "We could have done it," he says, "but it would have cost several hundred thousand dollars and they wanted delivery the very next week. It wasn't something you could do in a week. But it planted a seed in my mind. The big problem with working in 65mm film was that you had to use expensive work pictures and do everything on film. There was no way to do video transfers."

After conducting some research, Truckenmiller found that there was a large enough market to justify the expense of building a machine. Crest built a film transfer scanner compatible with the following applications: the 65mm 5-perf format used in conventional theaters; the 8-perf format, a 4:3 aspect ratio; the 10-perf format used by some Japanese planetariums; and the largest one known, Imax's trademark 15-perf format. "With this machine as our basis, we already had an understanding of wide-format restoration when Fox approached us to work on *The King and I*," he says.

Crest's scanner had already been used on restorations of *2001: A Space Odyssey, South Pacific, Oklahoma!, Chitty Chitty Bang Bang* and *The Sound of Music*, among others. But as none of these films were shot with Cinemascope 55-format cameras, they had to be printed on 55mm optical printers and shown with special projectors. Truckenmiller notes, "When we looked at the element, we realized we could modify our aperture plates and optics to scan Cinemascope 55's unique 8-perf format, which was the initial challenge."

More dilemmas occurred when Truckenmiller discovered that *The King and I's* original negative had suffered shrinkage; he and his team had to create a custom adjustable sprocket assembly to track the shriveled film. "There's no film handling equipment for 55mm film in existence. And damage had occurred that required corrective measures. But we had no rewind benches, no splicers and no cores — everything had to be custom-made."

Guessing that the existing 35mm CRI might be a starting point for sync reference, the team re-recorded it and then insert-edited the original camera negative in 55mm on top of it. "That was a way of assuring sync with the audio tracks and also that any damaged areas wouldn't result in loss of film frames," says Truckenmiller. In areas where film was lost, the restoration team matched, color-corrected and enhanced the 35mm color reversal internegative to replace the missing frames.

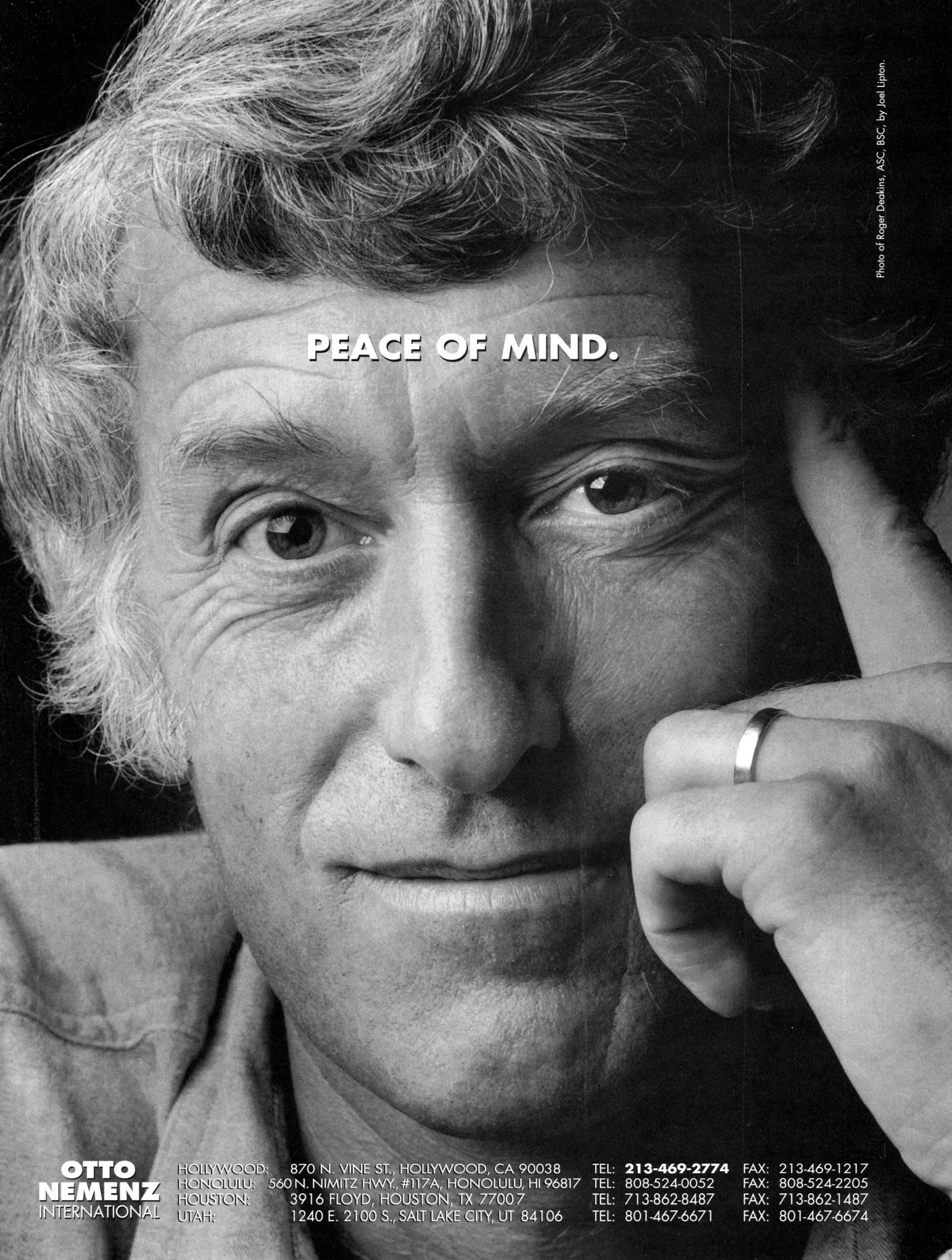
Truckenmiller points to the dilemmas that colorist Feneis faced during

AC Wins Maggie Award

American Cinematographer recently earned its fourth Maggie Award for editorial excellence in as many years. The Maggies, which are presented by the Western Publications Association, were handed out at the organization's 39th Annual Awards Banquet, held on April 26 at the Century Plaza Hotel in Los Angeles. *AC* took top honors in the category of Best Communications, Advertising and Entertainment Issue (Trade) for the November 1995 installment of the magazine, which focused on working relationships.

AC also received two other nominations, both for writing. Executive editor Stephen Pizzello earned his fourth consecutive Maggie nomination in the Best Interview or Profile category, for his cover story on the filming of *Casino* (*AC* Nov. '95). Pizzello won a Maggie at the 1993 ceremony for his coverage of *Twin Peaks: Fire Walk With Me* (*AC* Sept. '92). In addition, Contributing Editor Ron Magid received his second nomination (following a prior Maggie nod in 1994) for his coverage of special effects.

Over the past four years, *AC* has earned a total of 11 Maggie nominations. The magazine won two awards at the 1993 ceremony, and one at last year's event.



the restoration. "The cinematographer and director [Leon Shamroy, ASC and Walter Lang] had tremendous freedom with the widescreen format that Cinemascope 55 offered. They could place their action anywhere in that format. In the dance scenes, characters would move from hard screen right to hard screen left, and simple dialogue would be spread across the entire frame. [Shamroy] had to hide pans and camera moves while following the action."

Truckenmiller recalls that the wide-format transfer of *Chitty Chitty Bang Bang* was equally fraught with obstacles. "The lab work was done in a very unique way. They created the frame select printer so you wouldn't see a splice line in the theater. The film was conformed as an A-roll only, with an extra frame on the tail and head of each shot. When printing from original negative, the printer would run forward until it got to the appropriate cut point, advance the original negative two frames and then start printing again. When transferring to video, the film was instantly out of sync with the audio and, subsequently, became even further out of sync. What we had was basically a negative that got progressively longer. Here again, we created a matrix master from a 35mm print and then insert-edited every scene into the movie." The result was a pristine original negative, but the painstaking process involved over 3,500 edits.

Truckenmiller finds his current restoration project, a letterboxed version of *2001* destined for the European laserdisc market, just as amazing. "I could see the paintbrush strokes on the cyc walls in the scene with the monkeys," marvels the engineer. "That was actually shot on a soundstage and they painted the sky. You could never see that before, but now the detail is so tremendous that everyone looks at it with a closer eye. That's restoration in the large format. And it's a lot of fun."

Crest National Videotape and Flim Labs, (213) 466-024.

— Brooke Comer

Rhythm & Hues Wins Oscar for *Babe* FX

Rhythm & Hues, the Los Angeles-based studio which created polar bears for a popular series of Coca-Cola advertisements, was honored with an Academy Award for Best Visual Effects for their work on *Babe,* directed by Chris Noonan and photographed by Andrew Lesnie. Effects supervisor/animation director Charles Gibson oversaw some 132 CGI shots that imparted "human-like" qualities onto 95 live-action animals.

"What makes this effects work stand out is the extensive collaboration needed to combine live action, animatronics and digitally rendered animals," says Gibson." The performances by the animals needed to be emotional, believable and seamless for every scene. Dogs, pigs and horses are everyday animals that audiences are familiar with. Everyone knows that dogs don't frown and pigs don't smile, but *Babe* proved that a happy medium between live-action, mechanical and digitally created performances is an achievable goal."

According to Liz Ralston, feature producer for Rhythm & Hues, the complex process began with the effects team scanning the live-action footage of the animals, shot in Australia, into their computers. "The movements of the animals were then translated into 3-D geometry with the proprietary software developed specifically for *Babe*," says Ralston. "The animals were tracked in wireframe mode, then the animators worked with the models, manipulating the movements to create lifelike expressions and speech with dialogue supplied by Kennedy-Miller. Our three computer graphic supervisors would literally sit at the workstations and, with hand mirrors, use their own faces as inspiration for the animals. They developed the technique as a group, then standardized their procedures so the look remained consistent."

The rough animation was sent to Gibson for approval, after which it was checked and rendered at low resolution. Adds Ralston, "Every time we did animation, we would convert it to Avid file format and transmit it in real time over telephone lines to a workstation in Australia. They received our images and cut them directly into their workprint to see how our animation worked with the live action. Their cut was evolving constantly and the network connection allowed all involved to see if the animation was truly working with the cut."

Ralston, who along with Gibson visited Australia several times to gain valuable insights into farm animal behavior, says that it was the dogs, not the pig, that proved to be the most complicated of the animals to animate. "The

Continued on page 22

Making Comparisons?

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Citing Spacecam for "Expanding the boundaries and applications of stabilized cinematography", The Academy of Motion Picture Arts & Sciences has awarded Spacecam Systems the Academy Plaque for Scientific & Engineering Achievement.

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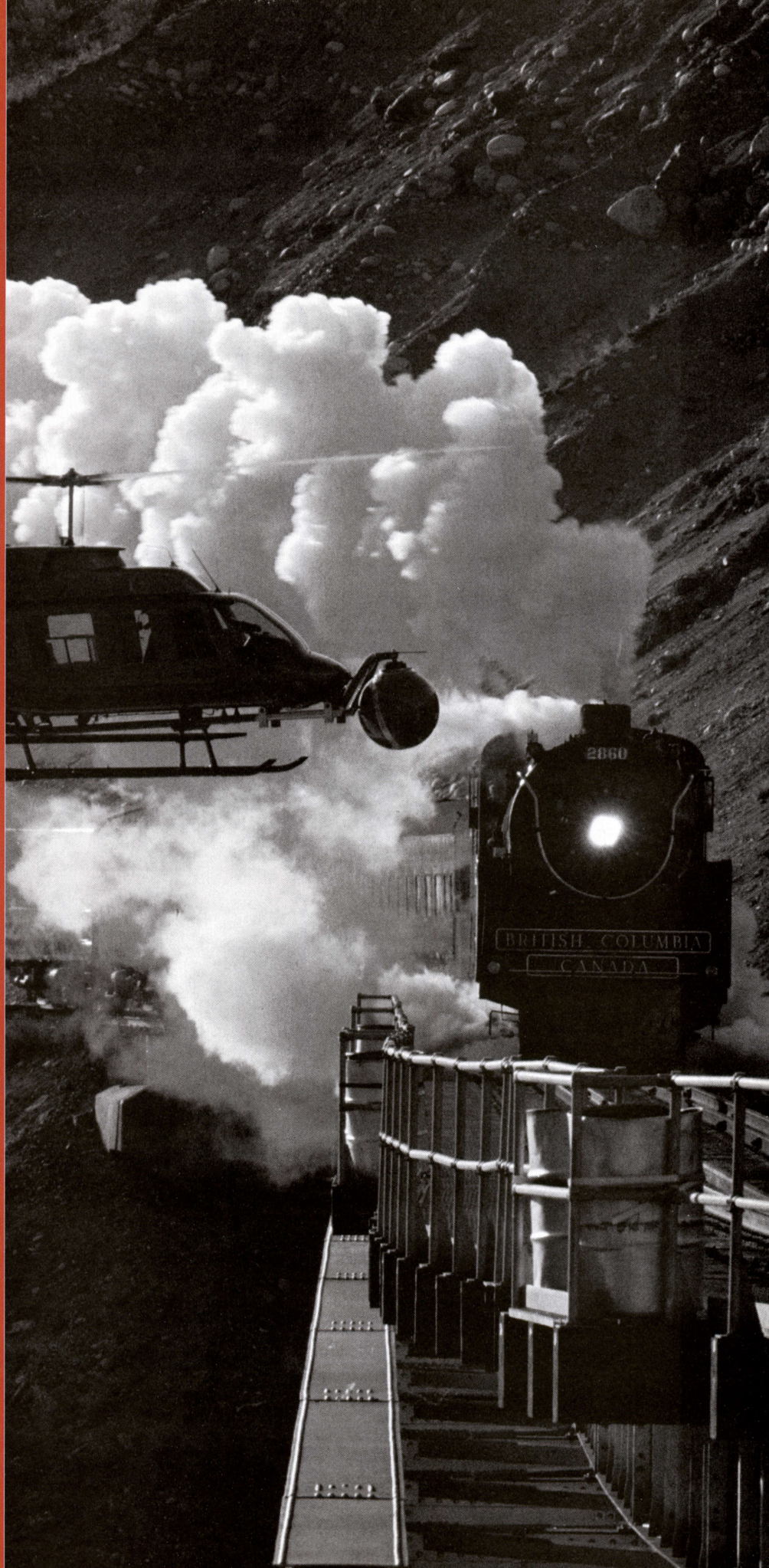


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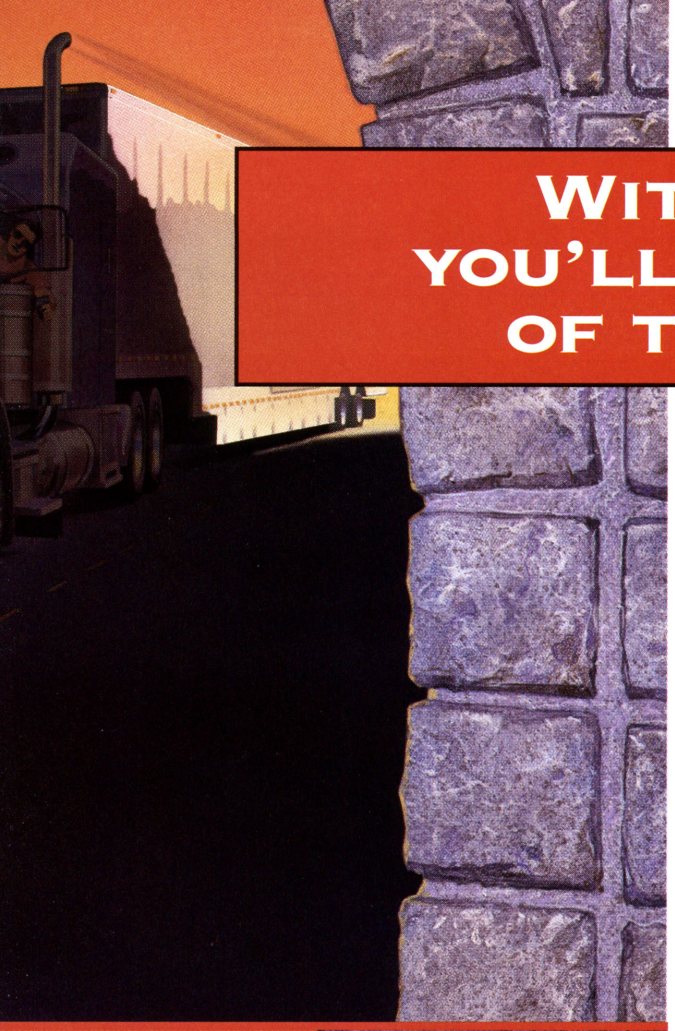

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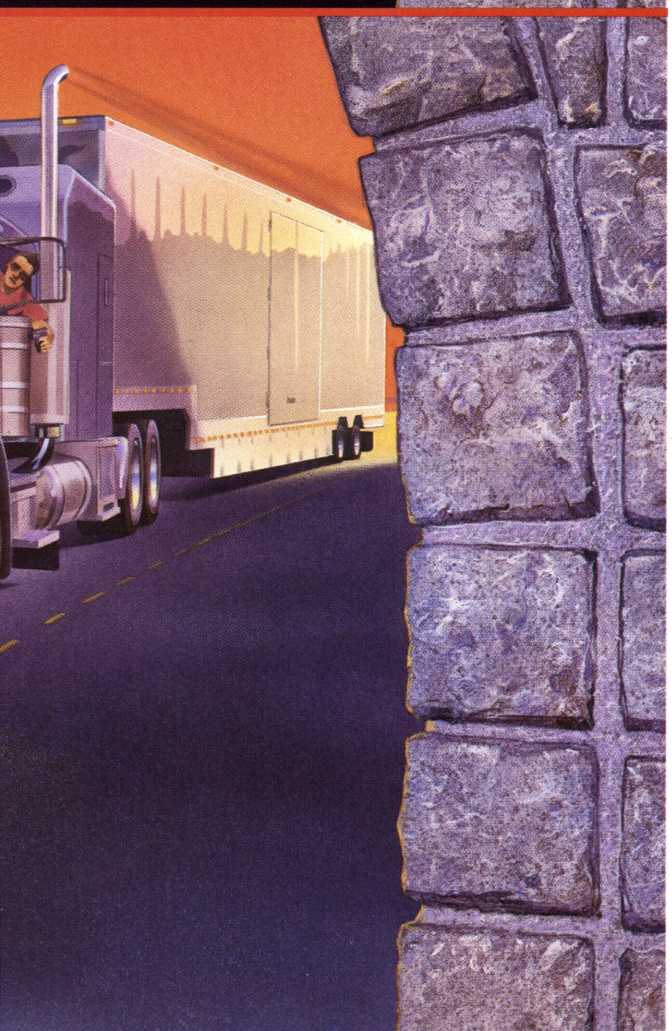

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dogs were often panting in the live action when they were supposed to be speaking in the film. We then had to re-create the bottom of the dog's face and chest. We had a lot of good reference material available, but making the fur look real is quite difficult. It's work that the audience won't notice, because they're not supposed to notice it. Each shot and every animal had to be treated separately, depending on the level of expression needed. In some shots, entire faces were animated — eyebrows, the eye and cheek area, and of course, the mouth. In all scenes, the animals' faces were treated with as much care as if they were human."

Rhythm & Hues, (310) 448-7500.

Braveheart Editor Receives ACE Award

Editor Steve Rosenblum earned the American Cinema Editors (ACE) Eddie Award for his work on *Braveheart* at a ceremony held on March 16 in Beverly Hills. It was the first time that an Eddie has been given to a feature film edited entirely with digital technology. Rosenblum and his assistants, Victor DuBois and Sheila MacDowell, used a system from Lightworks Editing Systems of Tektronix, Inc.

Lightworks Editing Systems of Teknotronix, (213) 465-2002; keith.lissak@tek.com.

CSC Awards

The 39-year-old Canadian Society of Cinematographers (CSC) presented its annual awards on March 30 at the Sheraton Center Hotel in downtown Toronto. The award in the Best Theatrical Feature category went to Vic Sarin, CSC for his work on *Margaret's Museum.* Sarin beat out Barry Stone, CSC (*Rude*, see *AC* March '96) and Paul Sarossy, CSC (*Blood & Donuts*).

The winners in the television categories were Brian Hebb, CSC for series (the "Escape" episode of the now-defunct Fox series *VR5*), and Ron Orieux, CSC for drama (HBO's *Tuskegee Airmen,* see *AC* Nov.'95). Other honorees included James Gardener, CSC in both the documentary (*Searching for Lost Worlds: Machu Picchu*) and music video (Crash Vegas' "Old Enough") categories; Barry F. Peterson, CSC for best commercial (Pontiac's "Duel"); and Bernard Couture for dramatic short category (*La Foret et Le Bucheron*). Global Television's Yhoram Pirotsky earned the Roy Tash Award for News Spot Cinematography ("Rock Climbing") while Don Scott of the Canadian Broadcasting Company (Calgary) was given the Stan Clinton Award for News Essay Cinematography for "Eckhart — Artist on the Edge." Jacques Bernier earned the Camera Assistant Award of Merit, and the Student Cinematography award went to York University's Ian Kenji Williams (*Greenstick*).

The CSC also awarded three special honors. Colin Davis, marketing vice-president of professional motion imaging for Kodak Canada, was given the Bill Hilson Award "for outstanding service contributing to the development of the motion picture industry." Documentarian Jim Mercer, CSC won the Fuji Award "for extraordinary contributions to the Society." Kodak's New Century Award went to Miklos Lente, CSC "in recognition of lifetime achievement in cinematography."

CSC, (416) 966-6710.

NYU Students Honored

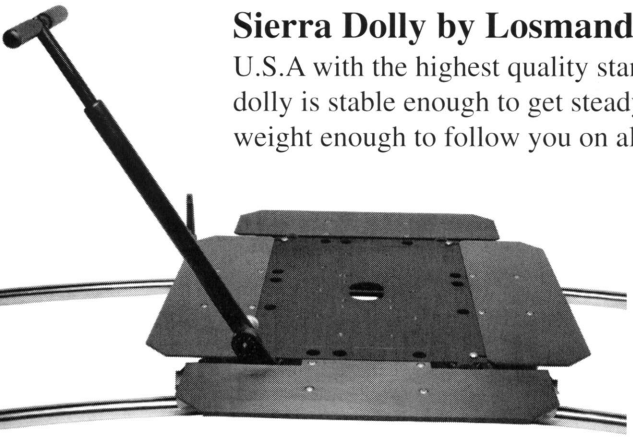
Six New York University film students were presented with the prestigious Wasserman Awards at the closing ceremonies of NYU's annual First Run Film Festival held on Saturday, March 30 at Lincoln Center's Alice Tully Hall.

First prize awards went to graduate student Phil Bertelson (*Around the Time*) and undergraduate Liselle Mei (*Ana: Portrait in Days*). Second prize went to graduate student Dung Nguyen (*Morning*) and undergraduate Matt Mailer (*The Money Shot*). Third prize recipients were graduate student Keir Pearson (*A Matter of Time*) and undergraduate Jason Ruscio (*Eclipse*).

The winners for the Tisch School's first New York Picture Company Award for screenwriting were graduate student Jeffrey Stanley in the dramatic division *(Lords of Light),* and undergraduate Dailyn Rodriguez in the comedic category *(Men Die).* In the video category, first prize was given to graduate student Brett Morgen *(Ollie's Army).* Undergraduate M. Blaine Hopkins and graduate student Steven Winter scored second place with their collaborative effort *Private Shows,* while Andrew Milkis took third place with *Chameleon.*

Previous award recipients include directors Spike Lee, Ang Lee and Nancy Savoca. The winners were se-

Show-Biz Expo *Booth 1534*



Sierra Dolly by Losmandy: New portable dolly designed for location. Manufactured in the U.S.A with the highest quality standards, this dolly is entirely machined out of aluminum. The Sierra dolly is stable enough to get steady shots with a jib arm, strong enough to last a lifetime and light-weight enough to follow you on all your shoots.

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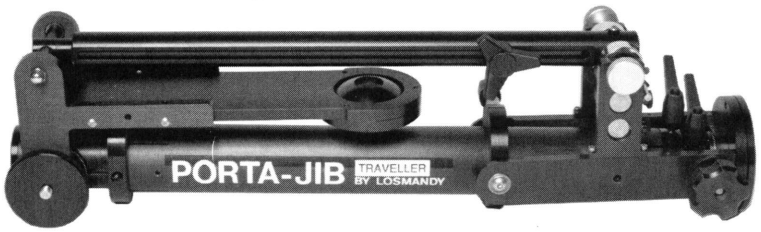

In addition to the Sierra Dolly and the Porta-Jib Traveller, we will display the **Losmandy studio Dolly, the Standard and Mini Porta-Jibs, and the Dual Porta-Jib** that eliminates the arcs.

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Hydraulic Cameleon Dolly: Pictured left with new electric hydraulic system.

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lected from a group of 17 semifinalists by a panel of judges that included such NYU alumni as screenwriter Richard LaGravenese and director Susan Seidelman, as well as Jeff Sagansky, executive vice-president of Sony.

NYU Press Office, Kim Brockway, (212) 998-6796; brockway @is2.nyu.edu.

Animated Music Special

Lightyear Entertainment has produced an animated music special for the Disney Channel and the 50th anniversary celebration of the United Nations. The 53-minute program, *People,* was brought to Teatown Video, a full-service postproduction house that specializes in long-format programming.

People, a journey of the imagination filled with music video segments, is based on an award-winning children's book that's been printed in some 20 languages since its release 21 years ago and has sold over five million copies.

More than 300 artists in the former Soviet Union created the special's animation over the course of three years. Eight different styles of animation were employed, including traditional cel, clay, color pencil, computer and stop-motion. The show was rendered, colored and composited on Power Mac workstations.

Moscow's Klassika Studio executed the animation, which arrived Stateside somewhat sporadically. Dealing with that time-lag was "a real exercise in *perestroika,*" according to writer/producer Joshua M. Greene, vice-president of children's programming at Lightyear Entertainment. Teatown's editors were so pressed for time that off-line editing was done on the Avid 1000 and 8000 systems.

"Meeting the deadline would have been impossible in a linear off-line situation," emphasizes Teatown's director of editorial services, Jon Fordham. "There was no time to wait for consecutive segments to arrive. Instead, Teatown built a sort of 'time line' of the show. As footage arrived, we sprinkled it in place. As more pieces came in, we filled in the blanks. We had to think ahead and be flexible for any surprises."

Dilemmas also arose with the format of the Russian animation. Having originated from strict storyboards, it lacked the frames necessary to create dissolves. "We added frames in the off-line so that when we on-lined, the images and characters would be synched exactly to the soundtrack," notes Fordham. "Without non-linear editing capabilities, we wouldn't have been able to maintain the integrity of the piece."

Another surprise was a gap in the Africa song sequence. To solve this, Teatown created a new three-minute animation segment, using their IMC motion-control camera to shoot lush illustrations from the Caldecott award-winning book, *Ashanti To Zulu.* Artist Miriam Silberman-Nives combined the images and enhanced the scenes with Teatown's Aurora paint and animation system. They also used the Avid to design complex, multi-layered sequences.

People aired in October on The Disney Channel and a CD soundtrack and home video release will follow.

Teatown Video, (212) 302-0722.

Crew Connection Opens in New York

The Crew Connection, one of the nation's largest video and film crew booking services, recently opened an office in New York City's SoHo district to assist its corporate and broadcast clients based on the East Coast.

The Crew Connection has provided local video and film crews, as well as technical support personnel, for locations worldwide since being founded in 1989 by Heidi McLean, a former audio technician and field producer with CBS News and NBC Business Video in Denver. Headquartered in Evergreen, CO, Crew Connection completed more than 3,500 assignments last year.

The company's extensive database of highly specialized camera crews has been tapped by the major networks and many nationally-syndicated programs. Crews are frequently provided to Fox Sports and Court TV, the New York bureaus of the Japanese networks TV Asahi and NHK, along with syndicators Heart Entertainment and King World, originators of *Inside Edition* and *American Journal.*

Since the opening of the New York office, its manager, Ellen Lash has pulled together staffing assignments for HBO's Super Bowl coverage, as well as for collegiate basketball games carried by the Sunshine Network.

Crew Connection, Ellen Lash (New York), (212) 431-0504, or Heidi McLean (National), (303) 670-0303. →

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View Studio Goes to Outer Limits

View Studio, a Hollywood-based artist-oriented digital effects design and production house, is contributing to the look of MGM's sci-fi anthology series *The Outer Limits*. In the episode "Resurrection," set on a future Earth inhabited by robots that are transformed into humans, View's creative director designed a digital model of the "womb," from which new humans would emerge. Says visual effects supervisor Steve Anker, who also designed three digital matter paintings for the episode, "From that rendering we built the 'womb' using latex and prophylactics." More basic effects were used in "Beyond The Veil." "We did some morphs, and in wide shots duplicated aliens and prisoners to give a "crowd" feel.

The 10-year-old View Studio has engineered computer playback for feature films *(Disclosure, The American President),* effects for TV series *(X-Files* and *Kindred: The Embraced)* and the Fox mini-series *The Invaders* and *White Dwarf*, and custom effects for Michael Jackson's "Childhood" video. They are also involved in CD-ROM production with Seventh Level's new "Monty Python Quest for the Holy Grail," title plus commercials for Prestone and Taco Bell, and show titles for *Live Shot* and *Boy Meets World.*

View Studio, (213) 965-1270, FAX, (213) 965-1277.

The Force is with Avid

Lucasfilm Ltd. has chosen Avid as one of its primary partners in the development of the postproduction process for George Lucas' much-anticipated prequel trilogy to the *Star Wars* series. Lucasfilm will utilize Avid's Film Composer, AudioVision, ProTools, Matador Media Share, Media Server and ATM networking products to create a completely digital postproduction process that will be a key component to the digital studio being developed currently by Lucasfilm.

Avid and Lucasfilm have worked closely to develop digital technology for the entertainment industry, beginning in 1993. This alliance has resulted in the creation of the AvidDroid Controller. As the newest manual user interface for film, it's derived from an original Lucas design. For the past year,

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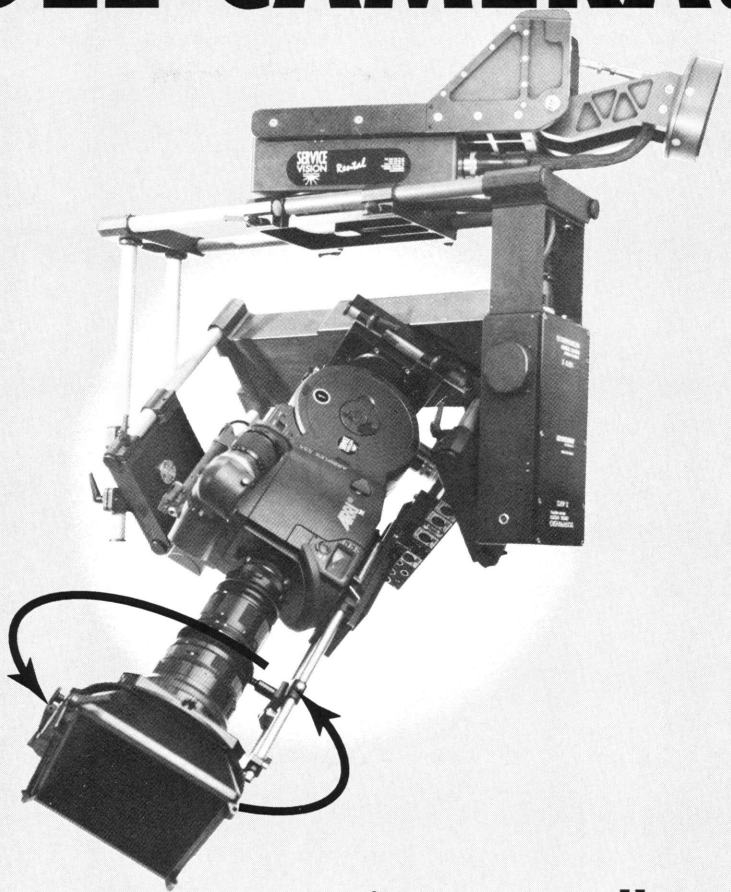

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the two companies have been collaborating on certain components of the digital studio, through the postproduction of the TV series *The Young Indiana Jones Chronicles*. This series will see the first workgroup configuration based on multiple Film Composer and AudioVision systems connected via Avid's MediaShare shared disk product. This work group will also be linked to Industrial Light and Magic via the Open Media Framework (OMF) Interchange format for the exchange of digital effects from products such as Avid's digital image manipulation products. The group will continue to expand with the addition of the media server, networking and asset management technology as the new *Star Wars* trilogy begins production in 1997. Lucasfilm is also employing Avid's technology on post-production of the Special Edition of the original *Star Wars* trilogy, to be released next year in celebration of the 20th anniversary of the original film's release.

Avid Technology, (508) 640-3071, Lucasfilm Ltd.,(415) 662-1962

Three Stooges Infomercial

New York-based Jeff Meltzer Editorial (JME) provided a complete creative package for a 30-minute infomercial for Columbia House Home Video's new series of classic Three Stooges tapes.

Executive producer Meltzer directed the segments with Curly imitator Bob Greenberg to wrap around scenes from the Stooges episode "A Plumbing We Will Go."

Art director Jack Chandler gave new meaning to the words "rec room," designing a set filled with elaborate water and explosive rigs created by a Jim Henson rigmaster. Greenberg's Curly runs amuck in the room complete with a telephone that squirts water, an overactive hot-water heater and a work bench that traps his head in a vice.

Meltzer also filmed motion-control product shots of the home videos, as well as 60 and 120 second spots that are integrated into the body of the infomercial. The program was cut on one of JME's Avid Media Composers. Rich Cutler at Magno Sound and Video performed the audio mix as well as the on-line and customizing for the show.

Jeff Meltzer Editorial, (212) 302-5423.

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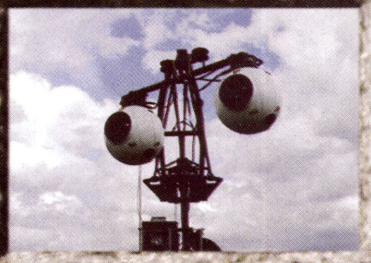

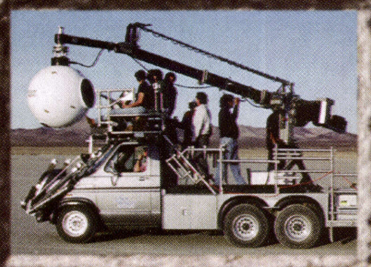

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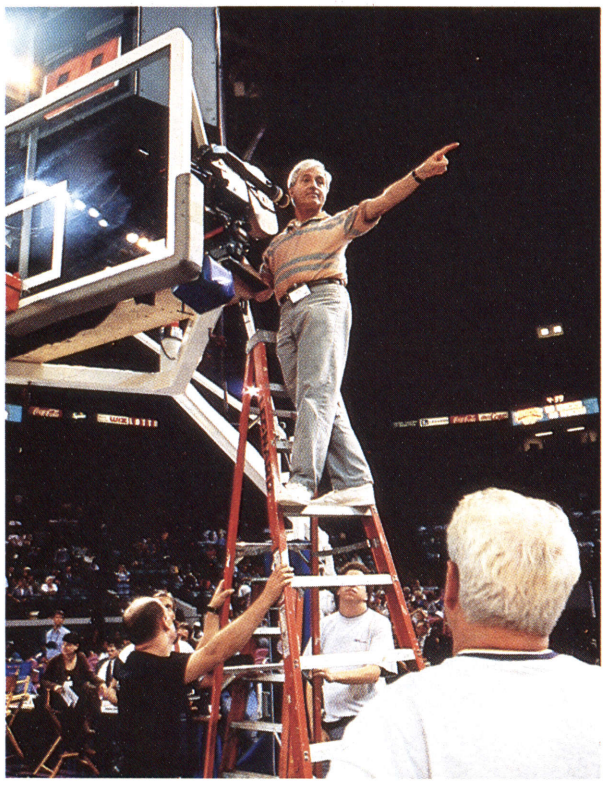
Hitting the Shots on *Eddie*

ASC President Victor Kemper adds hilarity to the game of hoops.

Interview by Bob Fisher

When director Steve Rash (*The Buddy Holly Story, Under the Rainbow, Can't Buy Me Love* and *Son-in-Law*) asked Victor Kemper, ASC to collaborate on the basketball comedy *Eddie*, starring Whoopi Goldberg, the veteran cinematographer immediately knew he would be dealing with a high degree of physical and visual humor.



Photos by Myles Aronowitz, courtesy of Hollywood Pictures Company.

Right: ***Kemper sizes up a through-the-backboard shot that will gradually pull back with the oncoming play action to reveal the hoop. Seeking inventive ways to cover*** **Eddie** ***'s game sequences became a priority in order to keep audiences engaged. The cinematographer's experience on the seminal hockey film*** **Slap Shot** ***no doubt helped.***

Asked to describe the story, Kemper succinctly offers, "It's about a dream that comes true. Whoopi plays Edwina Franklin, a basketball nut who earns a living driving a rental limousine in New York City. She's a diehard fan of the New York Knickerbockers, but the team is having a terrible season. The new owner of the Knicks (Frank Langella) is intrigued by her enthusiasm, and after a few games, contrives a way to have her win a contest and become coach for a day. You can guess what happens. She concocts these brilliant plays, and the team goes on a winning streak and makes it to the playoffs."

A native of New Jersey, Kemper graduated from Seton Hall University and started his career at a commercial TV station, running the lighting, mixing sound, and serving as technical director. That led to a job with EUE, a leading TV commercial house in New York. Screen Gems subsequently purchased EUE and decided that the company should concentrate on shooting film. At that point, Kemper and a staff director purchased all the videotape equipment owned by EUE, intending to build their own business producing commercials on tape.

But fate had a different destiny in mind for Kemper. At EUE, he had met Arthur Ornitz, ASC, a cinematographer who pioneered the use of natural light at a time when Hollywood studio lighting techniques were decidedly stylized. Their relationship grew while Kemper worked with Ornitz as an assistant and operator. In 1969, as John Cassavetes was preparing to shoot *Husbands*, Kemper was designated as the International Photographers Guild standby for Italian cinematographer Aldo Tonti. During preparation, it became evident that the language barrier between Tonti and Cassavetes was impenetrable, and the filmmaker asked Kemper to shoot the picture. Although Kemper was reluctant to replace a fellow cinematographer, Tonti urged him to seize the moment.

Kemper subsequently became one of the industry's most prolific directors of photography, with more than 50 features to his credit and a body of work that ranges from high dramas such as *The Candidate, Coma, The Last Tycoon, The Friends of Eddie Coyle, Magic, Dog Day Afternoon* and *The Eyes of Laura Mars* to visual comedies, including *The Hospital* (recently included in the Library of Congress' list of films marked for preservation), *Slap Shot, Oh God, The Jerk, Mr. Mom, The Lonely Guy, Pee Wee's Big Adventure, Beethoven* and *Tommy Boy*. Kemper is currently serving an unprecedented fourth consecutive term as president of the American Society of Cinematographers and shooting his next feature, *Jingle All the Way*, a seasonal comedy directed by Brian Levant and starring Arnold Schwarzenegger.

The following interview was conducted at the ASC Clubhouse in Hollywood.

American Cinematographer: **Are the actors on court in the film actually athletes?**

Victor Kemper, ASC: Most are real basketball players [including Dennis Rodman and Charles Barkley] and a few of them had speaking roles. John Salley was wonderful in the role of the old-timer. And the basketball plays were choreographed by Kurt Rambis, a former NBA player [with the Los Angeles Lakers]. The film is 90 minutes in length, and I'd guess 40 minutes is basketball action. It's is like a highlight film with a lot of suspense and athleticism.

AC: **How did those plays relate to the story?**

VK: Steve [Rash] would tell Kurt, 'I want a player on the other team to lose the ball to this guy on Eddie's team. The Knicks come down the court, and I want

so-and-so to score two points.' Kurt then translated Steve's directions into basketball plays. I was never a [basketball] fan, but I am now after I discovered how professional the players are, and how they use teamwork to win.

***AC:* Why was this picture shot in North Carolina?**

VK: One big reason is that this story is about an NBA basketball team, so half of their games are played on the road. Because of the logistics of photographing away games, we picked Charlotte as the location for the home court because there are so many NBA-class courts within an hour or two drive. Our home games were staged at the Charlotte Coliseum, which is the home of the Charlotte Hornets.

We made it look like Madison Square Garden.

All of the chairs were painted and the seat covers were changed to match those in Madison Square Garden. The floor had to be scraped and repainted with the Knicks' colors and varnished. The signage was changed to New York advertisers. It cost around $30,000 just to convert the court floor, and the same amount of money to put it back the way it had been.

***AC:* What was the most difficult technical challenge?**

VK: Filming the scoreboard in the background presented an interesting problem. It had four very large television monitors with projected video images. There were also incandescent light matrix boards for displaying scores from around the league. That caused an interesting lighting problem because the boards were so much brighter than the TV monitors, and they were adjacent to each other. It took some experimenting to record good pictures on the monitors without overexposing the boards. Fortunately, the [Eastman EXR] 5298 film has a broad range of exposure latitude.

That was only the second toughest technical problem, however. The first was the existing lighting in the Charlotte arena. That permanent plan was designed and installed by Musco and they did a tremendous job. I measured the level of light across the court from basket to basket, and it was very even. There was only about a 20 to 30 footcandle variance between center court and the sides. They used an ingenious combination of sodium-vapor and mercury-vapor lights that produced wonderful lighting for the human eye, but it generated tremendous green spikes that the film sees. I'd never seen anything quite like it. I could almost see the green tint with my naked eye. I thought it was going to take forever to shoot tests with color-correction filters, but then I remembered that Mitch Bogdanowicz at Kodak Research Labs was doing some work with an instrument called a spectral radiometer. It's a device he designed that measures where each color is being generated on the spectrum from any light source or reflected source. I asked Mitch if he could come to North Carolina and use his device to plot a curve that gave me the information I needed to compensate for the green spikes, because what I wanted were natural-looking prints.

***AC:* What were your alternatives?**

VK: The hit-or-miss testing method would have taken days. Mitch came to North Carolina for one day. He measured each light source on the floor of the arena individually for black, white and medium skin tones, in both the shadow areas and in pools of light. He then ran that data through his computer and came up with an astonishingly scary curve.

The lights were generating green spikes in such odd places that I was wondering if there was a solution. Mitch's program recommended a combination of filters on my lights and camera lenses that approximated the curve that the computer had plotted.

Mitch has programmed in all of the manufacturers' filter factors, including Tiffen lens filters and most Rosco gels, so the computer suggested that any HMIs used for fill light in the arena would require specific blue-green and green color correction filtration. We used a ¼ green on each lamp and a minus green [FLD] filter on my camera lens. We shot a test and it duplicated what the computer had predicted.

My printer lights at Technicolor New York were in the

Top: ***Actress Whoopi Goldberg faces off with iconoclastic NBA star Dennis Rodman (currently with the Chicago Bulls). Real players in the cast heighten the story's realism, helping to sell the comedy's fantasy element.***
Below: ***Shooting game scenes on the full court required deft dolly moves, with each play's choreography carefully plotted to avoid collisions with the players.***

low to mid-30s. That's where I like them to be without major deviations for color correction. When you are shooting on location with different types of source light, you generally have to compensate to correct the color temperature, but his data gave us a fast and accurate way to zero in on a solution.

AC: **What do you mean when you say the spikes were in odd places?**

VK: Properly exposed, most color film stocks today can handle this type of mixed lighting. However, as we got into the shadow areas, which is going to happen in an arena with multiple tiers, it got darker and darker at higher elevations. I knew that part of the scene would go entirely green. That was the problem we had to solve, because we didn't want the fans at the games to look green. Maybe that's a small detail to some people, but that type of unreality is what shatters the spell for an audience. If you give the audience even a subliminal clue that the games they are watching aren't real, it changes the emotional content.

AC: **Did you actually stage scenes on a full court?**

VK: Yes, so we had to compensate for those green spikes over a huge area. But after we found the solution, I didn't have one moment of disappointment viewing dailies in terms of color response.

AC: **I guess I haven't seen many NBA basketball games lately, because I remember Madison Square Garden with superbright areas and dark, shadowy areas.**

VK: That's changing as old and new arenas install modern lights. The mixed lighting sources would have given us a problem a few years ago, but the 5298 emulsion and the other newer films are designed to record a much broader range of contrast. That's what allowed me to take advantage of available light as the foundation for my lighting scheme. The seats were brightly lit near the court, but the light would fall off as we went deeper into the background, which was critical because I used it to disguise the way we had extras fill the seats.

On a few occasions, we had as many as 14,000 fans, but that's not really very many people if you're supposed to be in an arena the size of Madison Square Garden. I believe we had 9,000 cardboard cutouts of people, and we placed them in the darker areas. You see their shapes in the shadows, but your eye always goes to the brightest light in the scene. When you add the crowd noise to the action on the court, and the way [editor] Richard Halsey cut the film, there is a believable illusion that the teams are playing in front of wildly enthusiastic fans.

AC: **How did you handle the need for some fill light?**

VK: When we did big wide-angle shots, all I needed to do was put a few lamps high in the balconies. I didn't try to hide them. They looked as if they were part of the natural light in the arena. I defy anyone to find even one of the lamps we used.

AC: **What were the other locations?**

VK: The bulk of our work was in Charlotte. We also used the Hornets' practice arena in Winston-Salem. We also changed the look of the courts to make them look like arenas in other cities. Sometimes it was as simple as covering the Knicks' colors and stripes and replacing them with the symbols of another team. We actually changed the court in Winston-Salem so that it looked like three different arenas. The production designer was Dan Davis, the art director was Bob Shaw and the set decorator was Roberta Holinko.

All of the establishing shots were filmed in New York. We filmed some scenes at Madison Square Garden, but they were exteriors, stairways and escalators to establish the setting. Also included were exteriors around the city and the owner's office. We set that up so you can see the city through the windows. We also filmed some background scenes with Eddie coaching kids' teams to establish the fact that in one way or another she has been involved with basketball all her life. We also did some driving scenes on the streets of New York City, and Eddie's apartment was a practical location there. There were a couple of small sets,

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including a locker room, that were built in a warehouse in Charlotte, but this was primarily a location movie.

AC: **In any film, the relationship between the cinematographer and the star is based on trust. How do you establish that rapport?**

VK: I had never met Whoopi before, but I always make it my business at the beginning of a film to visit with the actors as soon as I know they are on the set. I want them to really believe that I'm there to help them and make them look good. We had a good first meeting. A couple of days later, I had a chance to chat with her about her philosophy as a performer. I said, 'Whoopi, I know it's always traumatic for an actor or an actress to start a film with a new cinematographer. I'm sure you have your favorites because everybody does. Speaking of that, I have regards to send you from Allen Daviau [ASC].' She said, 'Allen is my favorite cinematographer.' I asked her why. She told me that when Allen was filming [her first feature,] *The Color Purple,* she was concerned about the way she looked. It seems that Allen said, 'I don't know what you're talking about. You have a beautiful face.' She never forgot that and she still loves him for saying it. The fact of the matter is that Allen was absolutely right, she has a beautiful face. The thing that makes her especially beautiful is her ability to reveal her character on her face.

AC: **How much preparation time did you have?**

VK: Five weeks, and every minute was necessary because of all of the intricate basketball plays. I wanted to find a different way to shoot each play so the audience wouldn't get bored. We also had to make it interesting for people who don't understand the game. We choreographed the way the players moved, and the movements of the cameras, very precisely. Sometimes the camera is a spectator. Usually it's a participant.

I'd watch how Kurt [Rambis] designed each shot, and then I would find a different way to shoot the story point that each sequence was designed to make. In one sequence, I put the camera behind the glass backboard with the lens so close that the audience didn't know we were shooting through it. As the play developed and moved toward the basket, the camera was static until the last second when the team went for the shot. That's when the operator started moving the camera and revealed the basket. We shot from every conceivable angle and point of view, with the only rules being that we didn't intrude, and we tried not to repeat ourselves.

I had planned that one shot, but mistakes sometimes dictated a change in camera position. A ball would accidentally get hit out of somebody's hands, or someone would drop the ball or fall. We always tried to make something good come out of it, and we had to be alert to opportunities all the time.

AC: **You sound like Steve Sabol talking about NFL Films. Were you shooting this with one camera or multiple cameras?**

VK: We always had at least three cameras on the games. We stopped shooting masters because they got boring, unless the play had some feature that required us to see the entire court. Typically, we had a medium shot of Whoopi and maybe two very tight shots on the action. We would often have a camera on the far side of the court just on Whoopi, so we could watch her pacing, screaming and yelling.

She insisted on performing while we were shooting game action sequences. She didn't want to react to plays when nobody was on the court, which presented a problem. How many times can you run the players back and forth before they get tired? Steve very wisely tried to be frugal about how long he kept the plays going. We also did a lot of free play, which the players preferred because they could get warm and stay warm for a while. When we were shooting choreographed scenes, we'd do the shot, and then they would stand around twiddling their thumbs and getting cold while we decided if it was it good enough. They don't want to go out and perform again once they're cold.

AC: **Except for the people who play or attend the games,**

basketball is usually seen on television. Was there any discussion in that regard about people's expectations? Are they seeing the games as spectators in the stands or as a player on the floor or the bench?

VK: For the most part, we've tried to bring them down on the court with the players. But you can't see the plays develop when you're on the court. We always had another point of view equivalent to courtside seats. On the big screen, it's like watching a real game, as opposed to watching it on a big television screen.

AC: **How were you moving the cameras to create visual tension?**

VK: We did some handheld work, put dollies on the floor and designed the plays so that the cameras weren't in the way. The players just worked around them. We did some very fast dolly shots, bringing plays up and down the court. We also tracked very much like you see television cameras do at games, around the entire length of the court behind the bench and just slightly elevated over the players' heads.

We did some crane shots, but it was difficult for a crane to move that fast. The inertia of a crane is such that it takes a lot of energy to get it moving. By the time you do, the action is over. But I did some shots with a small, lightweight crane mounted on a dolly and we tried to follow the action in a number of ways and pull back to see the shot going in the basket.

AC: **Were there times when you had a great shot, except the ball didn't go in the basket?**

VK: We had plenty of those. We'd run the entire play and would get wonderful coverage and the ball would miss the basket. Some directors would have shot the action and cut in an insert of the ball going in, but Steve felt that would be cheating the audience. He wanted them to feel as if they were there watching the game. We did very little cheating, except in montages of time passing. Those were obviously cuts. But we tried to be true to the spirit of the game, so whenever you see a basket scored, it was always part of the play and was never an insert.

***AC:* How about cameras and lenses?**

VK: I mainly used Panaflex gear, but we had some Arriflex cameras for handheld shots. I use Steadicam only if a shot really dictates that you need it. Handheld camerawork lent energy to the scene, while I felt that the Steadicam would smooth things out too much. We used a Steadicam one day for a shot for which it was best suited.

I used Primo zooms a majority of the time. With all the action on the court and with the plays coming toward and from the camera so often, the field size would change dramatically. At other times we wanted to keep the size of the image consistent in the frame. There were also times when we wanted it to feel as if the camera was a character moving with the play, and we couldn't put a dolly on the court for logistical reasons. For those sequences, we used the zoom to follow the play.

***AC:* In addition to making the audience believe they are seeing actual games, the other key to the film is the empathy they feel for Eddie.**

VK: That was very easy, because of Whoopi's style of acting. But there was nothing glamorous about the way we lit her. That's not what this story is about, so I let the content of each scene dictate the way we lit. If it was a dark scene, we wanted the audience to feel the darkness or the fact that it was night. I also motivated our lighting with visible or identifiable sources. If someone looked flat, we'd use some kickers or side backlight, but it always looked natural. I didn't want the film to feel as though it was lit. You need a little more light when you are filming someone with darker skin tones, but that was relatively simple with Whoopi. Her personality shows on her face and she has kind of a glow when she smiles. I don't think there's a person in this world who isn't going to feel good when Eddie smiles, and that's a good definition of empathy.


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"Dominoes" New York Life by Chiat Day. Directed by Kevin Godley. Produced by James Chads, Medialab, UK. Post-produced by The Mill, London.

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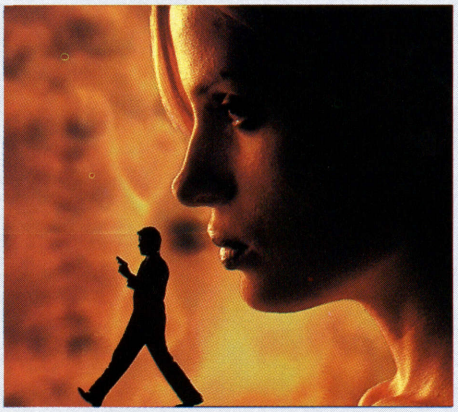

GoldenEye title sequence. Designed and directed by Daniel Kleinman. Produced by David Botterell, Limelight for Eon Productions, Ltd. Post-produced at FrameStore, UK.

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Photos by Murray Close, courtesy of Paramount Pictures.

Imaging the Impossible

Cinematographer Stephen Burum, ASC resumes his longtime collaboration with director Brian DePalma to bring the seminal spy premise of *Mission: Impossible* to the big screen.

by Benjamin Bergery

IN A SMALL, DARKENED PROJECTION room, two men sit and watch fragments of an action movie with no soundtrack. Beaming forth from the wide-format anamorphic screen beam are powerful images of Tom Cruise, Emmanuelle Beart, Jon Voight, Kristen Scott Thomas, Emilio Esteves, Vanessa Redgrave and Jean Reno. As the actors converse, struggle, or embrace in silence, their exclusive audience exchanges a few sparse comments: "Tom's face is a little red." "Emmanuelle needs more blue."

The setting for this scene is Deluxe Laboratories in Los Angeles, where Stephen Burum, ASC is finalizing of the answer print for *Mission: Impossible* with timer Denny McNeill.

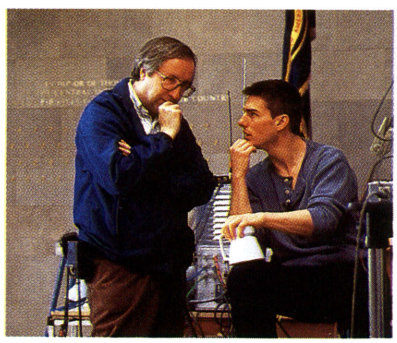
After months of preparation and the frenetic production itself, the answer-print stage is a time of closure for many directors of photography, a period when they can sit back and appreciate their work. Burum likens the cinematographic process to "conducting a symphony orchestra: you're so busy bringing in the violins, doing this and doing that, that you don't have the real joy of listening to the music, of really feeling the music. And when you're timing and you get down to the third answer print, it hits you all of a sudden: you have the time to enjoy what you did. Until then, you just don't."

When timing a film, the cinematographer scrutinizes the color, brightness and quality of each individual shot, gauging its coherence against the surrounding shots in the sequence. The answer print is stricken directly from the negative; its set of yellow, cyan and magenta corrections are the foundation of an interpositive from which release prints will be produced, via the internegative. By the second or third release print, the major timing adjustments have been made, so the rest is merely a matter of fine-tuning. According to Burum, skin color is the clearest indicator for refining image quality and tone at that final stage.

"When you're timing, you want to get a reference that will serve as a standard, so that the lab can clip it out and put it next to their timing machines," he explains. "When there are major ad-

justments needed, you tend to say, 'Let's make it a whole lot more yellow or a lot more blue.' Later you talk about skin tone a lot because it's harder to define; it's a very finicky and subtle hue."

Mission: Impossible is based on the popular television series of the same name, which initially ran from 1966 to 1973 and was briefly resurrected in 1988 with an all-new team headed once again by actor Peter Graves' unflappable Jim Phelps character. In each episode, the IMF (Impossible Mission Force) team had to devise and execute a plan aimed at solving some seemingly insurmountable espionage problem, such as rescuing a prisoner from an impregnable fortress. The plan always involved cutting-edge technology, elaborate disguises, split-second timing and stealthy deception, and the danger



and difficulty of the mission kept the television audience in suspense for an entire hour.

The feature film version is directed by Brian DePalma, whose relationship with Burum is well established. Over the past 12 years, the two filmmakers have collaborated on five previous features: *Body Double, The Untouchables, Casualties of War, Raising Cain* and *Carlito's Way*. Both men share an encyclopedic knowledge of cinema and a passionate enthusiasm for filmmaking. The lengthy collaboration between the duo seems a natural one, as a keen appreciation of film history informs the work of both.

DePalma is best described as a postmodern director; his films are full of references to past directors such as Eisenstein, Hitchcock and Antonioni. He knows every storytelling trick in the book, and doesn't hesitate to use them. It is telling that Quentin Tarantino cites *Blow Out* (shot by Vilmos Zsigmond, ASC) as his favorite film, for in many ways, the young auteur is DePalma's heir. Critics sometimes lambast the director as a mere maker of showy homages, yet, like Tarantino, he infuses his references to past films with a very contemporary irony that creates a personal vision.

In a very different way, Stephen Burum has used his own love of the classic Hollywood tradition to enrich recent American cinematography. A master stylist, Burum has on several occasions assimilated the aesthetics of bygone genres and transformed them into original and modern imagery. Witness the highly stylized rendering of detective serials in *The Shadow*, or the brilliant melange of film noir and comedy in *The War of the Roses*. Burum's distinguished career spans from the stunning second-unit cinematography on *Apocalypse Now* to his masterful, Academy Award-nominated work on *Hoffa*. In addition, he has received ASC Award nominations for both *The War of the Roses* and *The Untouchables*.

After working with DePalma on so many pictures, Burum says that he and the director speak in shorthand on the set. "I love working with Brian. He's the greatest; he knows exactly what he's doing. There's not much dialogue between us on the set. [The collaboration] is not artsy at all, but very matter-of-fact. I have an expression that I use: 'DePalma left and right.' If Brian says the frame ends at a certain point, it's going to end there. There is no reason to shoot anything past that point."

Burum also understands DePalma on a personal level. To an outsider, he says, "Brian may seem gruff, but he keeps all of his feelings inside." The cameraman realized this during the shooting of Al Pacino's death scene in *Carlito's Way*, when he saw the director "with tears in his eyes."

For viewers familiar with the TV series, the opening of *Mission: Impossible* is misleadingly familiar. The film starts with the obligatory "self-destructing" tape of instructions, but this time the game plan is outlined on video instead of a reel-to-reel recording. An IMF force that includes the film's hero, played by Tom Cruise, is assigned to retrieve information from the safe room of an embassy in Prague. The agents are outfitted with a host of high-tech gadgets, including explosive chewing gum and wireless video eyeglasses. Later on, there is a key sequence involving the Internet, presented in

***Opposite:** As seen on the cover of this issue, Tom Cruise's IMF agent executes a gravity-defying break-in at a CIA nerve center. Burum (at left with the actor/producer) lit the scene brightly to add tension, noting, "It enhances the suspense if you can see everything because there's no place to hide."* **Below:** *production designer Norman Reynolds' IMF headquarters set. On his work with Burum, he says, "I involve Steve as much as possible on the set design. It was quite selfish really, because the easier I made his job, the better the film was going to look."*

a realistic manner that is rare for today's cinema.

The embassy mission takes place during a crowded diplomatic reception and IMF operatives lurk everywhere in the building, including the elevator shaft. Much of the sequence is shot from a subjective point of view — that of an agent mingling amongst the exquisite crowd. (Burum notes that DePalma often makes succinct reference to his shots as being "either objective or POV.") This long Steadicam shot, a vintage DePalma setup, brings the audience into the movie. Despite some harrowing moments, the mission seems successful. But the movie's tone changes abruptly with the mysterious murder of several team members in the foggy Prague night. Thus ends any similarity with the TV series.

As a survivor of the failed mission, Cruise comes under suspicion, but dramatically escapes capture. In an attempt to uncover the specifics behind his betrayal, Cruise organizes a renegade team to penetrate the CIA headquarters in Langley, Virginia. In a daring and suspenseful incursion into the inner sanctum of the CIA computer room, Cruise obtains information that leads to startling developments about the botched proceedings in Prague. Following a confrontational journey on the high-speed TGV train linking London to Paris, the movie culminates with a spectacular climax in the newly-constructed Chunnel under the English Channel.

Burum is quick to point out that, like *The Untouchables*, *Mission: Impossible* is not a remake of a classic television series, but rather an "embroidery" of one. For the cinematographer, the appeal of *Mission* lies in the audience's fascination with the role of technology in espionage-related problem-solving. "The same elements that made [the premise] popular back then make it popular now. How do you solve insurmountable problems? The audience gets to ride with the spy and see all of his tricks, the high-tech gadgetry. Each character is a very skillful operator, a specialist in his field. The audience likes to see a master craftsman, somebody at the top of his form, whether he is a computer expert or master spy."

In many ways, Burum's description of the IMF operatives applies to the cinematographer and his collaborators; students of cinema enjoy seeing accomplished filmmakers solve storytelling problems with elegance. Viewers will relish the inventive and sophisticated camera movements and angles devised by Burum and DePalma. One can almost imagine someone saying to the cinematographer many months ago, "Your mission, should you choose to accept it, is to light the entire city of Prague at night, and you have three weeks to do it."

Like an IMF mission, the production of the film was a race against time, shooting on location in Prague and London, and on sets built within the vast Pinewood Studios soundstages. However, the film's British production designer, Norman Reynolds, notes that the film's European locales merely enhance its essential spirit. "*Mission: Impossible* is an American action film, in the best sense of the term," he says. "Nobody does [action thrillers] better, and this project represents the best of that genre. The film was very difficult logistically, but it was finished on time and on budget, which is quite an accomplishment in itself."

Reynolds, who earned two Oscars for his memorable design work on *Star Wars* and *Raiders of the Lost Ark*, is well-positioned to comment on the relationship between the production designer and the cinematographer. "The designer [helps to set] the picture's tone in visual terms. Now that's apart from the cameraman, who obviously has the ultimate control in that area, because he can make it dark, light, colored or whatever. So what we designers do is very much in the hands of cameramen. I certainly stay in touch with the cameraman as much as I possibly can.

"While we were in Prague, Steve was obviously very

Following his strategy of backlighting for night scenes, Burum devised a complex system for a 12-day shoot along the Vlatava River — which primarily used the historic Charles Bridge and the area around the Embassy (lower left corner of diagram). He explains, "The four 6K HMIs on the Manesuv Bridge were backlights for the water, while the two 6Ks on the shore backlit the underside arches of the Charles."

On the stone bridge itself, the two sets of 6Ks on lifts were only used when the camera was pointed north. While shooting south, the four 6Ks on a 210' lift near the Embassy were utilized. And when shooting east, the four tower-mounted 6Ks were used. Burum details, "The 6Ks on the barge were used to crosslight when looking east or west on the Charles, and we had about 450 1K Pars to light the city in the background. The 1Ks lighting the face of the Charles were at the water's edge, mounted on pilings driven into the river bottom. The pilings were designed to break up ice during the winter and already had lights mounted there, so we took advantage of those positions. In all, we had about 50 footcandles for the key, so we were shooting at an f4 on 5298.

"It took about two weeks to lay all the cable and we had 11 generators, with everything — including 24 brand-new 6K HMI Pars — all supplied by Lee Electric in London."

N
Prague Castle
Manesuv Bridge
Old Town Area
Charles Bridge
Vlatava River
Detail Area
Island
Legit Bridge
MANESUV BRIDGE
4 6K HMI Pars
Prague Castle
2 6K HMI Pars
3/4 mile
1K Pars for City
2 6K HMI Pars
4 6K HMI Pars on Tower
700'
1K Pars on City
2 6K HMI Pars on 80' Lift
2 6K HMI Pars on 80' Lift
CHARLES BRIDGE
1K Pars set low for face of Buildings
1K Pars set low for Bridge
1/2 mile
1K Pars for City
4 6K HMI Pars on 125' Lift on Barge
Embassy
4 6K HMI Pars on 210' Lift

MISSION IMPOSSIBLE (BRIDGE SEQUENCE)
CINEMATOGRAPHER: Stephen Burum, ASC; **DIRECTOR:** Brian DePalma

involved in location scouting and preparing things, so there were times when he and I were separated. But when we moved to the studio, I involved Steve as much as possible in the set design. It was quite selfish really, because the easier I made Steve's job, the better the film was going to look. We liked working together, and that's really the name of the game."

In planning their visual design, Burum and Reynolds referred solely to the script and not at all to the television series. In fact, Burum confesses to having never really watched the TV show. "I remember a little from college, but I never got a chance to see an entire episode," he admits.

Following the natural divisions of the script, Burum created a different lighting approach for the missions in Prague, Virginia, and on the TGV train, producing a visual diversity and rhythm that enriches the film. The cinematographer summarizes the three moods he sought to evoke as "old Europe, America and new Europe." In Prague, Burum sought to create an atmosphere that evoked "the old European spymaster stuff. You know, the spymaster slinking around, dining in chic restaurants, smoking cigars and drinking brandy, while some Eurasian woman is wearing a tight silk dress with a mink dropping off her shoulder, with a Twenties bob hairdo — the Mata Hari thing. Here you are in Prague, which has just been freed from the Communists and is still mysterious, almost Oriental. Anything can happen, and of course all kinds of nefarious devious stuff is going on because everyone is grappling for power, and everything is up for grabs."

In lieu of Mata Hari, *Mission: Impossible* features the ravishing French actress Emmanuelle Beart as an IMF member and romantic interest for Tom Cruise. To give Beart a "more ethereal" appearance, Burum chose his customary black silk stocking diffusion when shooting her close-ups. Onscreen, the diffusion is subtle and Beart's face still looks sharp. The cinematographer explains that "women, even heavily diffused women, don't appear diffused on film because their makeup accents their eyebrows, eyelashes and lips, which gives you a false sense of sharpness. For example, normal lip color blends in with the face but, with lipstick and liner, the lips look a lot sharper than they really are."

> "We went against every ounce of common sense, but we persevered and succeeded. We came out about a day ahead of schedule."
>
> — Stephen Burum, ASC

Most of the "old Europe" sequences in Prague take place at night. From the look of the film, the crew had the run of the Czech capital. The venerable but run-down Natural History Museum posed as the embassy's reception hall. Key exteriors were shot in Prague's two prime tourist spots: the beautiful square at the center of the old town and the famous Charles Bridge. These picturesque nightscapes required an execessive amount of light, since *Mission* was shot in the anamorphic format. For Burum, the lens T-stop setting is an essential factor in the quality of widescreen images.

"Many people ask me why my anamorphic shows look so sharp. It's because I know which stop to put the lenses at. You can't get an anamorphic lens below T4 and keep it sharp. In desperate situations, I have shot scenes at T2.8. I've been able to get away with it because I light very hard and very contrasty, which gives the images a phony sharpness. But if you try to light an anamorphic image at T2.8 with a soft light, the image will have no snap." Rawdon Hayne, Burum's assistant cameraman, was instrumental in this endeavor.

Burum used Panavision's C-series anamorphic lenses, which he prefers to the E series because of their small size. "There's something about the older lens design that gives the appearance of a bit more depth of field. In point of fact, the term depth of field is baloney; there is only one point of absolute focus. Everything in front and everything behind is not really in focus, but rather seems to be in focus to your eye. If you have a lens that is ultra-sharp or heavily contrasted, then you see that difference in focus immediately. Older lenses are not quite as sharp, so they only appear to have more depth of field."

Burum chose Eastman Kodak's 5298 stock for the entire film. Its speed facilitated the lighting of night exteriors and dim daytime exteriors in Northern Europe, and gave a healthy T-stop for the anamorphic format. Says Burum, "I usually rate 98 at 500, but for Rank in London, I rated it at 400, because there was a difference in their processing." The cinematographer used the English lab for rushes, and its Los Angeles sister

When shooting below his preferred stop of T4, Burum would sometimes create a "phony sharpness" with hard, contrasty lighting, also adding extra separation between actors and backgrounds.

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Even with 5298, lighting Prague by night for a T4 was a gargantuan effort. Recalls the cinematographer, "We had to light two miles of riverfront on either side of the bridge. We ended up carefully placing 450 1K Par lights to duplicate the architectural lighting."

Burum complemented this army of small units with two kinds of bigger fixtures he first discovered in Europe: a 6K HMI Par developed by LTM, and a variation of a balloon light invented at a small French company called Publux. The 6K HMI unit houses its bulb in a parabolic reflector that permits a minimum of flooding and spotting control, thus enabling the cinematographer to throw light onto the Charles Bridge from another bridge and a river barge, from distances of a half a mile away or more. The concept behind the light balloon, like many brilliant ideas, is disarmingly simple. Translucent material is filled with helium and fixtures for quartz lights. Let the balloon float to the desired height, turn it on and voila: instant soft lighting. Burum wanted more wattage than the original 4K Publux balloons offered, but the company was unable to deliver it, so the cinematographer asked Ronny Pierce of Lee Electric in London to build four 8K models that hovered over the Charles Bridge. Burum notes that the balloons also came in handy when lighting the stairwell of an interior location in the elegant Europa hotel.

> "As a cinematographer, you are responsible to the story, to the director, to the actors and the production company."
>
> — Stephen Burum, ASC

Of course, all of these 1K Pars, 6K HMI Pars and 8K balloons had to be rigged, powered and positioned. Add a lighting barge, 200-foot platforms and industrial-strength smoke machines to create a fog effect in already adverse weather, and it becomes apparent that the cinematographer had no reason to envy a Cecil B. DeMille production.

"It took us three nights to set the lights, and we had 20 walkie-talkies for the electrical department alone," he recalls. "There were a couple of nights when we only got two or three shots because it snowed, and then it rained very hard, which ate the fog. After that there was strong wind, and the fog didn't stay. We went against every ounce of common sense, but we persevered and succeeded. We came out about a day ahead of schedule."The cinematographer's invaluable right-hand man in the massive effort was gaffer Laurie Shane.

One unintended result of this logistical feat is that the next generation of tourists will buy postcards that could conceivably be captioned, "Nighttime Prague, lit by Stephen Burum, ASC." With a smile, the cinematographer remembers, "All of the postcard photographers were out, and they couldn't believe their luck; they never had never seen such a well-lit nightscape."

Unfortunately, for the sake of the *Mission: Impossible* story, "a lot of the footage was left on the cutting room floor," but the nighttime footage that remains in the picture is richly mysterious. As the blundered mission unravels, the disoriented IMF members wander in a dangerous fog. The HMIs set an overall blue ambient light, punctuated by white from quartz sources and keen yellows to mimic sodium-vapor lamps. Burum had the characters wear dark coats to keep a black reference in the diffused blue fog. "Fog varies a lot: sometimes you can see through it, sometimes you can't. What I tried to do was to layer light and dark areas in the fog — like *Dr. Jekyll and Mr. Hyde* or Owen Roizman [ASC]'s work in *The Exorcist*."

After the mishap in eastern Europe, the film's action moves to the CIA headquarters in Langley, Virginia. The building's bright and sunny interior is a striking contrast to the moody Prague night scenes. Burum eschews the cliché that well-lit scenes are less dramatic than dark ones. "Lighting a scene brightly, with a high degree of visibility, sometimes means avoiding a tacky choice. For example, Gordon Willis [ASC] did a wonderful 'high visibility' suspenseful picture, *All the President's Men*, using fluorescents to create a very natural lighting. We all love to do Vermeer, but it's not always appropriate. There is a great difference in light between Northern Europe and the United States, so I used a very soft wrap-around light for the European stuff, and I purposely used bright sunshine with shafts of light coming through the window for the American sequence. I used very hard light to create shadows, though I did cut it off above the neck so that the faces were in a softer light."

Burum goes on to prove that, paradoxically, a "brightly lit" image can sometimes create more drama than a dark one. Such is the case with a highly suspenseful scene in which Cruise's character attempts a daring daytime break-in of the CIA computer room, suspending himself by a rope dangling from an ventilation shaft. "I could have made the inside of that computer room dark and mysterious, with silhouettes; it's a choice. But it's much more intense if you can see everything, because the hero is completely exposed, and has to do his magic out in the open. It enhances the suspense if you can see everything; there's no place to hide, and the hero is a dead duck if someone walks through the door."

The high-tech CIA computer room set is a good example of the collaboration between production designer Reynolds and Burum. Reynolds drew his inspiration from his previous set designs on *Star Wars* to create a space that was also a self-contained soft light source. This futuristic white room is a seamless integration of luminescent plexiglass panels with dozens of photofloods and 216 diffusion behind them. The effect is an expanse of shadowless whiteness. To ensure the purity of the white light, Burum overexposed the panels by about three stops to "burn out any color. It's an old photographic trick: if you want to get rid of oversaturation, you overexpose, and if you want heavy saturation

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to get a weird color, you underexpose." Cruise wore a black outfit to retain contrast and sharpness in the extremely soft light.

Burum says that much of the suspense in *Mission: Impossible* was created by trapping the protagonists in confined spaces. "Throughout the picture, the characters are stuck in airplanes, in elevator shafts, in air-conditioning ducts. There's no place to hide. If you get caught in a tunnel and there's somebody coming, you have no way out — it's that feeling of being completely vulnerable at all times."

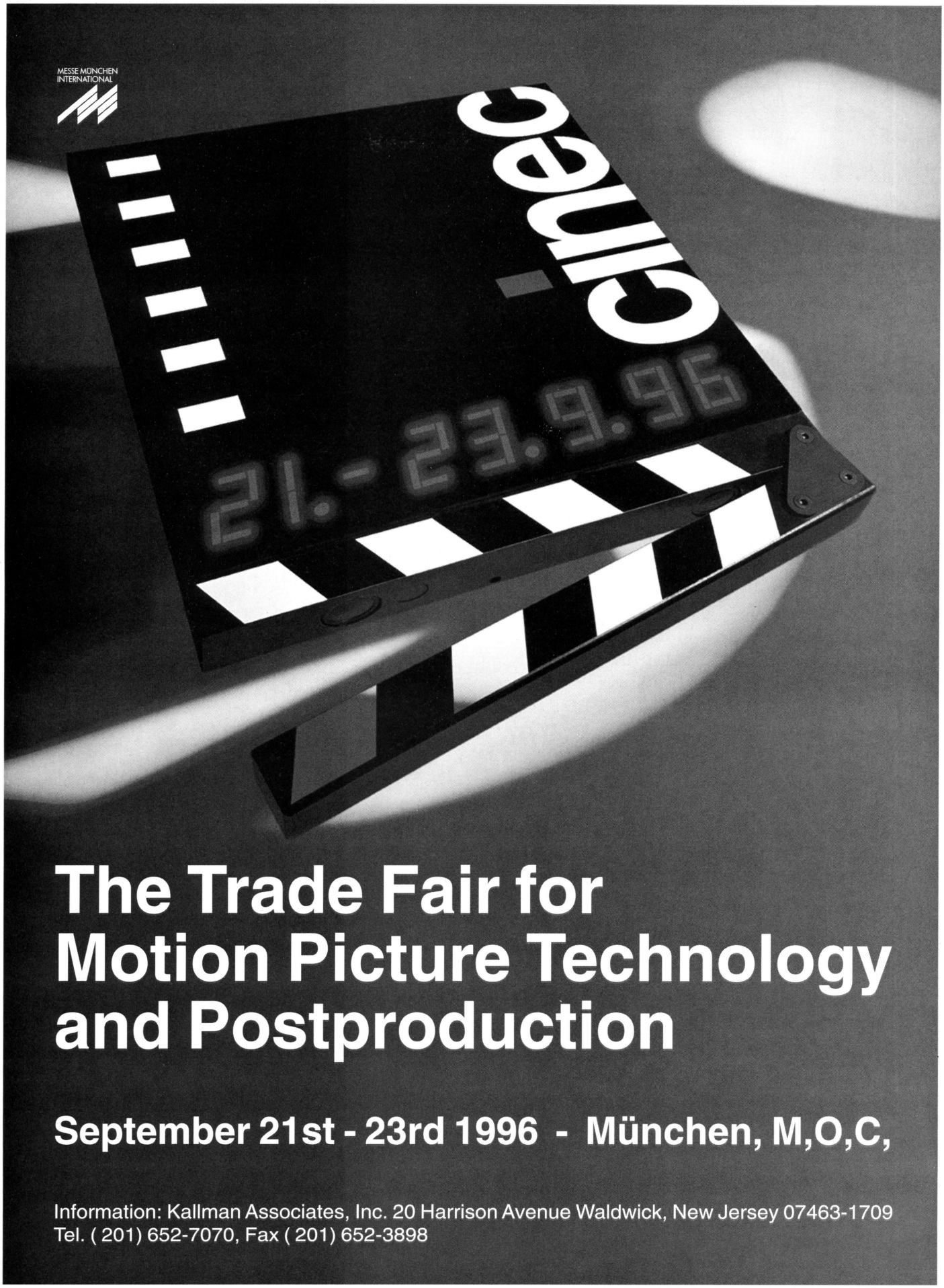
The IMF protagonists are similarly entangled in the final act of *Mission*, as they ride the TGV train at 80 miles an hour. Shot on a soundstage at Pinewood, the sequence used extensive bluescreen CGI (computer-generated imagery) to create the rapidly moving landscape and Chunnel walls. Burum finds nothing radical about shooting film for digital manipulation. "Everyone makes it out to be very complicated, but it's not; there's nothing to it," he maintains. "CGI is a simple matting process that happens to be done in the computer instead of with an optical printer. For the cinematographer, the technique is basically the same. Figure out the areas that you want to cut out, and place other footage in the hole you've cut."

The cinematographer adds that, when the camera is moving, CGI requires a three-dimensional reference in the frame, so that the computer model can track the camera's path. "Some people like to put in a cube with white points on it, some people cut tennis balls in half. We used big orange dots and white X's in the blue screen area. The dots or X's are connected in the computer to make wireframes, from which the computer can interpolate the camera movements. Then the other footage in the blue area can be altered accordingly." Burum credits special effects supervisor Richard Yuricich, ASC for the amazing verisimilitude of the effects on screen. (His work on *Mission* will be covered in *AC*'s special effects issue in December.)

Mission: Impossible also contains some old-fashioned process shots. Towards the end of the Prague sequence, Cruise shares a ride with Vanessa Redgrave in a sedan with tinted windows. The street footage behind them is a rear-screen projection. The effect is both convincing and evocative, but belongs in the "old Europe" category. On the other hand, the lighting design of the TGV interiors is Burum's interpretation of new Europe's "kind of clean modern Bauhaus feeling, only not using Bauhaus colors." The cinematographer lined a series of 10Ks on one side of the train set, all positioned at the same angle, to create a sun for each window. On the shady side of the train, 10Ks were fitted with cardboard snoots and equipped with 216 diffusion to create "a big soft wrap-around light, then we placed fluorescent tubes down the center of the train that weren't quite as bright." The colors of the train images are muted, and the light is restrained yet sunnier than the Prague footage. Visually, the effect is a marriage of the Prague softness and Virginia harshness. When the train enters the tunnel for the climactic scene, the fluorescents provide the main lighting, complemented by a flickering strobe that mimics the lights zooming by on the Chunnel walls.

Months later, after the release-print session, Burum recalls the frantic everyday pace of *Mission: Impossible*. "I think [it happens] to every cinematographer, especially on a big picture. You spend a lot of your time with administrative details. You're always in the thick of the battle, you're catching up, you're running this crew, you're running that crew, you're talking to the director and you're making sure that the actress feels great about the way she looks. It's as if you are constantly tweaking and maneuvering this great big machine. You have to keep turning the dials and you would like to have five whole minutes to be able to look at the setup and kind of comtemplate. But that's a guilty pleasure, because as a cinematographer, you are responsible to the story, to the director, to the actors and the production company."

His mission complete, Burum looks pleased, and not the least bit guilty.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A Passion for Color

With *Stealing Beauty*, an intimate tale of youth, director Bernardo Bertolucci and cinematographer Darius Khondji, AFC combine their creative energies.

by David E. Williams

THE REMARKABLE BODY OF WORK created by director Bernardo Bertolucci and cinematographer Vittorio Storaro, ASC, AIC has been one of the most visually influential on the current generation of filmmakers. Encompassing 24 years and 8 films (*The Spider's Stratagem, The Conformist, Last Tango in Paris, 1900, Luna, The Last Emperor, The Sheltering Sky* and *Little Buddha*) the duo's collaboration is a master class in texture, color and movement.

One of the pair's most admiring students was rising director of photography Darius Khondji, AFC, whose own feature credits include *Delicatessen, Before the Rain, The City of Lost Children* and the shock-filled, neo-noir *Seven* (see *AC* October 1995), which earned him a 1995 ASC Award nomination and the Chicago Film Critics Award. In addition, Khondji recently completed principal photography on director Alan Parker's *Evita*, shot on location in Buenos Aires, Budapest, and London.

Landing his position on *Stealing Beauty* was a coup for Khondji, whose talents earned him the opportunity to work with one of his longtime idols. "Bertolucci was one of the directors from whom I discovered movies in the early 1970s," the cameraman recalls with enthusiasm.

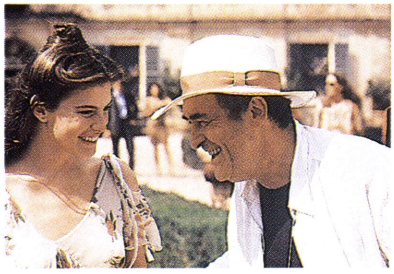
An Iranian native raised in Paris, Khondji studied filmmaking at New York University before embarking upon a successful career in commercials and independent features. "For me, Italian movies were *the* movies," he maintains. "And this is very funny, because when Bernardo and I discussed films he would say, 'Cinema is *French* cinema and French is the language of cinema.' But I had learned to speak Italian fluently by watching films by directors like Bertolucci and Michelangelo Antonioni. So I couldn't believe it when my agent told me there was this 'little film' Bernardo was making and that he was not working

Lucy and Nicolo (Liv Tyler and Roberto Zibetti) share secrets amidst the pastoral beauty of Tuscany. Kodak's 5245 was widely used to take advantage of the brilliant sunlight the location-shot production regularly enjoyed.

Photos courtesy of Fox Searchlight.

with Storaro this time — that they were taking a break from their work together."

Bertolucci explains, "After doing 'big' movies like *The Sheltering Sky* and *Little Buddha* — big for me in not only the sense of production and scope but the ambition of their making — I had to detoxify myself and do something more intimate, small and light. So I think the visual process I used on this film had a different kind of desire and need behind it. Vittorio and I have worked together for many years, and at the end of making *Little Buddha* [see *AC* May 1994] we said, 'Why don't we have a break from each other, to find a moment and look in other directions. We are so close that this would give us something to bring back to each other.' So I looked around and saw some of Darius Khondji's work.



One of the reasons I decided to go with him is that he is much like Vittorio was back in 1969 when we were shooting *The Spider's Stratagem*, the first movie we did together and one of his first in color. In Darius, almost 30 years later, I found an incredible enthusiasm — which you can see on the screen. He has a constant sense of rediscovering cinema and lighting. He also has a tremendous sense of integrity in deciding how to light something; he looks at things with a kind of virginity. [For this film] it was an Impressionism that I wanted, and I found it in Darius."

Says Khondji, "As I told Bernardo, working with him and thinking about his work with Storaro is like working on the ledge of a tall building. And, as a cinematographer, that could be very disturbing because their films together have been such a brilliant collaboration. But this was also my first experience with a great, well-known director. It was a similar situation with Alan Parker [on *Evita*.] But very soon after beginning each project I forget all about that and focused on my work — where the camera would be, which colors to use, and everything else."

Left: ***Khondji readies Tyler for a take. He notes, "After shooting so many days with the 45, I hardly needed a meter anymore.*** **Below left:** ***Bertolucci enjoys a moment with his actress. To highlight the rich colors of the location, the director often chose to costume his performers in whites and pastels.***

Considering the fact that Khondji was already so familiar with his style, Bertolucci says, "It was a pleasant feeling. We didn't have to waste too many words, since he had studied my films. Vittorio and I knew what we had done in the past, but Darius had a similar kind of reference."

Written by novelist Susan Minot, *Stealing Beauty* is the story of Lucy Harmon, a young American girl (played by 18-year-old Liv Tyler) who arrives in Italy's historic Tuscany region to stay with English expatriate friends (Jeremy Irons and Sinead Cusack) of her recently-deceased mother, and renew a romance with a young man with whom she experienced her first kiss some four years prior. Amid the lush, scenic splendor of the vineyards, Lucy's youth and allure revive the passions of her jaded hosts.

For Khondji, this world was far afield from the bleak, dangerously dark atmosphere he helped create for *Seven*. "In many ways that's true," he agrees, "but *Seven* was also naturalistic yet stylized, as this film is. One thing, however, was that Bernardo asked me at the beginning to be very much at the service of the actors. This was going to be a very different experience for him in comparison to his recent films. He wanted to come back to the style of his early work; the camera and the lighting were not to be showy in themselves. Instead, he wanted things to be very passionate in terms of colors. He didn't want to hide the cinematography, but he wanted me to be able to capture this very sensitive story instead of overwhelming it. He didn't want the film to be too heavy on the production side, which made it very different from what we did with *Seven*. Instead of that gritty darkness, this film was about feeling *light*. For instance, even before we began filming, one of the first things Bernardo talked to me about was music.

"He was always very humble in the way he spoke about the film, saying, 'Oh, it's just a small, low-budget film I want to do in Italy.' Then we began to talk about Mozart. It was very important to him, and once it was decided that I would shoot the film he asked, 'Can you listen to his music?' Of course I did, listening to many of his concertos, so I began the movie completely taken with the music of Mozart.

"Bernardo wanted to adapt the structure of Mozart for the film, beginning very light and then becoming very dramatic. And the movie is exactly like that, beginning with not much happening and then building strongly."

Says the director, "There is something difficult for me to define here, but the tone of the film is like going from Mozart to Chekov. There are quite profound scenes, but I found it essential to find the answers in music and poetry rather than prose."

A quiet evening moment. Khondji utilized crane-mounted Dinos constructed with boosted aircraft landing lights to illuminate nighttime landscapes. Although not a standard practice of his, the cinematographer added CTB gels to make his faux moonlight "a bit more theatrical."

In addition, Bertolucci asked Khondji to study such post-Impressionist, Fauvist painters as Matisse, Derain and Marquet, as he saw the inclusion of their rich color aesthetic as one way to inject weight into this "light" film. Deeply saturated reds, blues and oranges became the palette. "The colors were very important, present and moving in their work," the director explains. "And that was incorporated by our production designer, Gianna Silvestri. For instance, the film takes place entirely around a very cosmopolitan house on a hill in Tuscany, so we took red dust and colored the winding road that leads to the top. So we have this very red road running through the surrounding vineyards, creating a very strong impact between it and the greens. However, the costumes were designed to be less striking, appearing as pastel tones rather than real colors, in order to give the dominant power to the landscape."

Asked if the characters were assigned particular colors for meaning, as they often have been in his past films, Bertolucci frankly answers, "No. You know, Vittorio and I often became kind of obsessed with the metaphors. But an audience can go see a film in Italy and, because of the projector lamp and the screen, the colors of a film will look very warm. In Paris, the average theater has very cold lenses and screens. So the result is two very different movies, and all of our desires are subjected to that. But it is not only the equipment at the theaters, it's also the eyes of the audience. People in Minnesota see a film very differently than they do in Vienna."

Says Khondji, a cinematographer best known for his deft utilization of deep and inky shadows, "I was not able to use as many blacks on this film as I usually would, but that brought me to look instead for the contrast between individual colors and even the shades of colors."

To expand his contrast range, the cameraman relied on Technicolor Rome's ENR processing system. Named after chemist Ernesto N. Rico, this process was developed initially for Storaro to use on *Ladyhawke* in the mid-1980s. The forerunner of Deluxe Labs' CCE process that Khondji used on *Seven*, ENR retains silver in the print by skipping the final fix bath and instead running it through a black-and-white developer to deepen the blacks and enrich the hues. "I also had my regular color-timer, Yvan Lucas, who has done all my films, go to Rome to do this film as well," he adds.

Many members of the production crew on *Stealing Beauty* were veterans of Bertolucci and Storaro's endeavors. Khondji relates enthusiastically, "I had an amazing camera operator, Enrico Umetelli, who had done, without exception, all of Bertolucci's movies and many of Storaro's other films. Bernardo asked me if I had an operator in mind, and it was clear that [my being on the film] was such a huge change that he was nervous about working with so many new people. Directors generally like to work with the same crews and have the same people around them. So he very nicely, very politely asked me, 'Would you mind using my camera operator, whom I'm familiar with?' So I thought about it and knew the best thing would be to meet him. But once I did, Enrico made me feel so confident. He moved the camera with so much grace, like he had a feather in his hands, and he made the Bertolucci shots — the movement we all know from his films. So by using Enrico, it was like keeping Bernardo's eye intact."

In describing the Italian team, Khondji notes their classic craftsmanship, explaining, "There was a precision to their work because they had worked together so often. They didn't have the most modern technology or equipment, but everything they did was done with the utmost quality, and it was done *fast*. If we needed a tower, scaffold or rostrum, it was built of wood and constructed like a *bridge*. It was really solid and a work of art in itself. My young gaffer, Stefano Marino, did a terrific job and the key grip, Aldo Colanzi, worked on all of the fantastic Luchino Visconti movies I love, like *The Leopard*. He is the memory of Italian cinema and a master of his work. It was great to watch.

"So on three pictures in a row I have worked with fantastic crews — the amazing American crew of *Seven*, the experienced Italian crew of *Stealing Beauty* and the excellent classic English crew of *Evita*. All have been very different from the other, but all were fast, professional and good."

Given *Stealing Beauty*'s relatively-modest $10 million budget and the filmmakers' desire to

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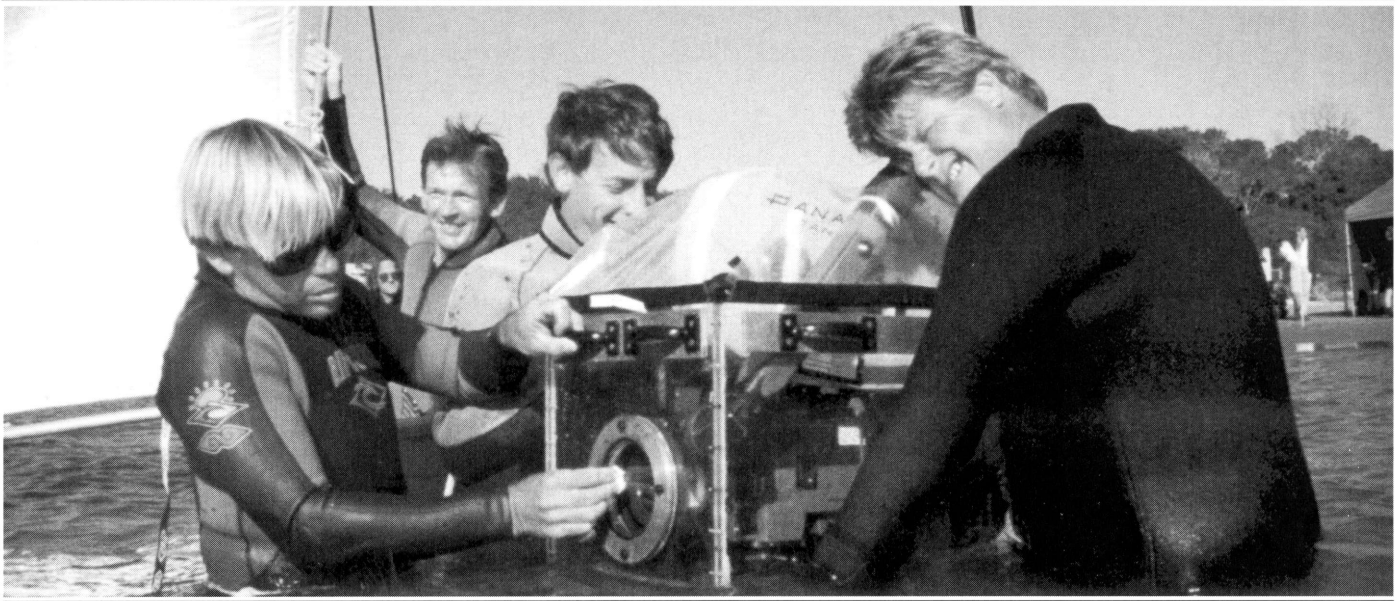

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use multiple cameras throughout the shoot, Arriflex BL4s, outfitted with Cooke lenses, were the cameras of choice. The cinematographer notes, "They are the only lenses I'll use other than Primos, but their beautiful softness also gave me the feel I wanted for Liv Tyler's skin. The mood of the film is very sensual, and Bernardo and I very much wanted her skin to be like satin."

However, what would be strictly defined as "lens filtration" wasn't used to this end. Khondji explains, "What I told myself from the beginning was that my soft filter on this film would actually be my Cooke lenses. The Cooke glass would be the softest filter ever, to bring out the softness of Liv Tyler's skin and the light. So I would always try to shoot her realistically, without any diffusion at all. I tried a Mitchell A, which is the lightest diffusion you can get aside from a net at the back of the lens, but even that was too soft. She needed to be photographed with nothing but the Cookes, which were very beautiful. We also lit her very softly, through very deep diffusion — using the thickest Rosco or Lee papers that exist."

He continues, "On the screen, it's almost as if you can touch her face and body. And Liv is a very sensual actress, so it was best to keep her natural and not try to make her seem more sophisticated or anything."

To further define Tyler's role, Khondji devised a unique lighting scheme specifically for her. He explains, "Although we couldn't do it all the time, I suggested to Bernardo the idea of lighting Liv entirely with flourescents, which I thought would bring to her a sense of modern America. Fluorescent light became a symbol of modernity, a texture from her background and character.

"Cinematographers have used fluorescent tubes for years, as far back as Fritz Lang's *Metropolis*. But I think it was the Kino Flo company that made it practical and professional. So I had a small package of their fixtures, trying to light her in the middle of Tuscany — this world of stone, old culture, paintings and literature. It was difficult, as Kino Flos are good for medium shots and close-ups but not wide shots. Yet for the few times it worked, the effort was worthwhile because Bernardo liked the concept that she would bring the glow of modernity into this place."

Interestingly enough, the director admits that such planning is not his strong suit. With a gentle laugh, he says, "I am not a director who often knows what he will shoot the following day, which is why when I have worked in the United States I have often had many disconcerted-looking people around me. I don't do storyboards — but I'm very interested in working with the actors and inventing shots. So Darius was often improvising, but I think there was a great harmony between us.

"Specifically though, I like to discuss lighting before we start the film and at the rushes, but during the shooting, I really try to leave as much freedom as I can to the cinematographer. This is what I do with Vittorio, who has a monumental personality and passion, and with Darius it was the same. I think what he was able to do with his lighting was to give Liv Tyler's face the range of the many women that are inside this one girl. Emotionally, she can be 13 and she can be 30, and this was very much because of Darius' lighting; he really understood when to help her become a little girl and when she had to be more mature."

Khondji offers, "Bernardo discusses imagery on a very emotional level, particularly in terms of color. In the film, every scene has particular patterns of color. We spoke about it a lot while on our location, and he was often very sad, because he needed the warmth and energy of the sun and we had so much bad weather."

However, sunshine did prevail in many instances, allowing Khondji to extensively utilize Kodak's 50 ASA 5245 daylight stock for exteriors. The plan was to backlight such scenes with large tungsten fixtures — Dino lights and Maxi-Brutes — to create a warm rim around the actors. 5293 was used on overcast days.

In pursuit of the Fauvist look, Khondji says that he "shot

with no depth of field to create a more impressionistic feeling. I was generally dropping the exposure down a few stops. But it wasn't as drastic as it was on *Seven*, where we were trying to increase the effect of everything we did. Everything here was about subtlety, so I put in ND filters to drop the exposure on all the exteriors to at least an f4 to 5.6. On *Seven* we never shot exteriors above a 2.8. In Tuscany, even while using 5245, backlit the way we were doing it, we were getting about an f11, so with a polarizer or ND6 we'd find ourselves at a 5.6. You just have to be sure that your shadows are about a stop and a half under and whites are two stops under in order to be realistic. But this film was shot entirely on location, all in one house and around the surrounding countryside, so it was very limiting in terms of camera and lighting."

The villa proved to be the greatest dilemma for Khondji. "It became a big problem because we could not get light through the windows, as they were very small and rooms were very deep. So we had to have the lighting within the room, but that was contradicted by the fact that we wanted to shoot the film in sequence with a very mobile camera. Imagine shooting and moving 180 degrees or 360 degrees as you are looking at the floor and then the ceiling. You have to put the lamps somewhere. I put them outside when I could, to boost any sunlight coming through, but I also used a lot of Chinese lanterns with very large bulbs inside hung from the ceiling, which I would dim down to make them even warmer. We used a homemade dimmer box our crew had built, which we plugged all of our lights into."

Camera movement, which Khondji considers to be as much a hallmark of Bertolucci's style as color and lighting, was used extensively on *Stealing Beauty*, primarily by means of the Steadicam operated by Nicola Pecorini. The cinematographer comments, "The countryside was very rough, and while it was possible to sometimes lay track outdoors, it was impossible in the villa because of the lack of space."

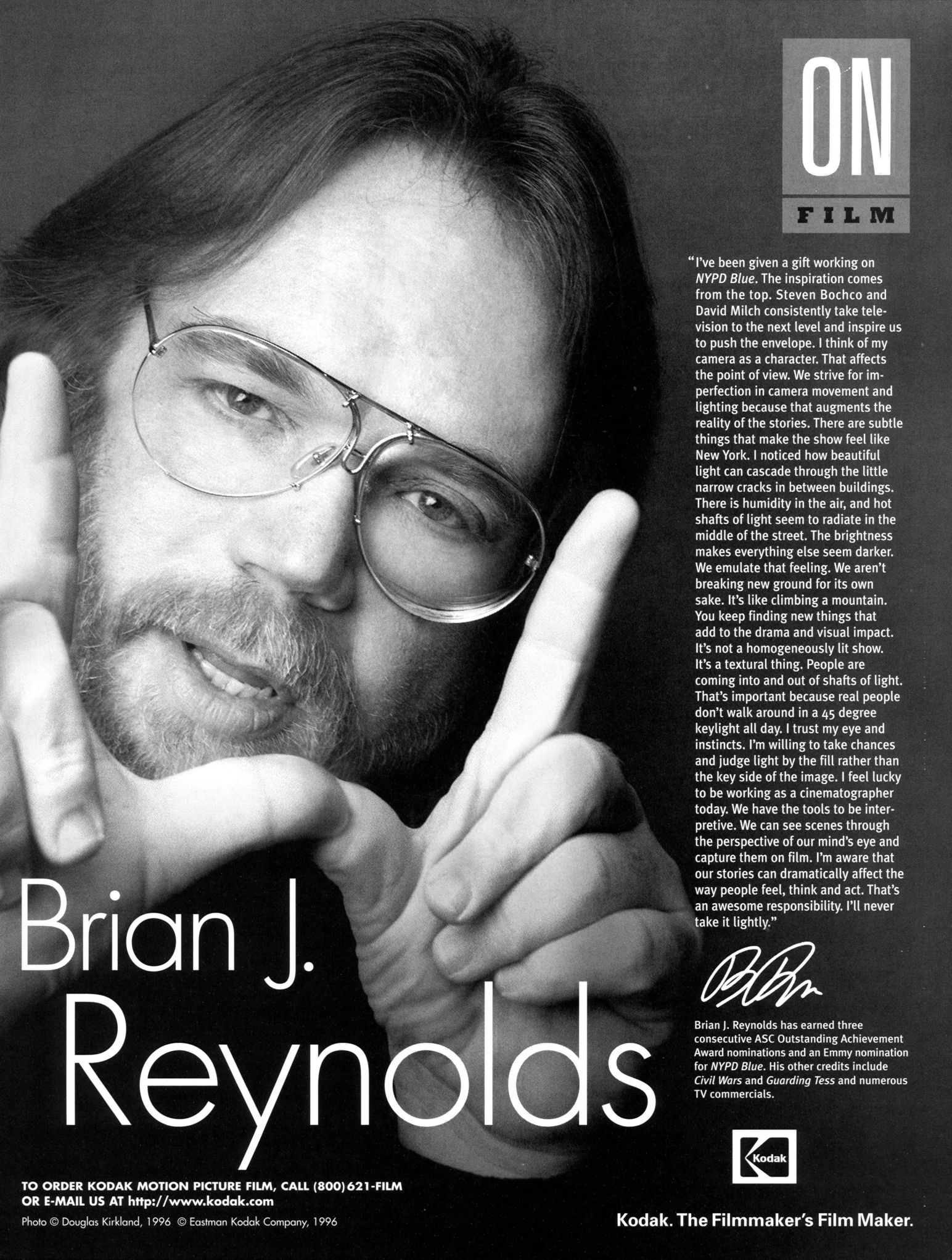
Says Bertolucci, "My camera moves a lot, but in *Stealing*

Beauty, it moves even more than usual. I always have this kind of deal with my directors of photography: I work with the camera operator and the actors and he concentrates on the lighting. For me, Darius' great inspiration was in the lighting, although he did suggest the use of Steadicam, which we used a lot. But when you talk about angles and movement, that is really my kingdom. In my movies, I try to use the camera like an invisible character — although sometimes I can't help but be a bit self-indulgent with it."

Laughing, he adds, "One can do with a bit of self-criticism. Twenty years later, some particularly acrobatic [move] may appear to be very self-indulgent. But every film has a different mission. To me, *Little Buddha* was like an Italian melodrama, a Verdi opera with emperors, generals and concubines. So there was a great desire to be visually melodramatic. But in *Stealing Beauty*, the lightness of the touch was important."

Unfortunately, the entire film could not be shot with the aid of the sun. The nighttime sequences led Khondji to use a fairly traditional technique. He explains, "We created a fake moon, which looked even less natural than I would normally make it. Other than the sunlight, this film was shot entirely with tungsten sources with the exception of the Kino Flos — but no HMIs. So what I used were one or two very high cranes with sets of 3200° tungsten Dino lights and Maxi-brutes constructed in a half-moon shape. They were built by the crew with aircraft landing lights, which were then boosted to give us more intensity. You can boost them by about 50 percent, which makes them very bright. And these cranes were set up very far away, which gave us a soft lighting across the house and the hills. Then I really warmed up the light coming from my Chinese lanterns and practicals, to increase the color contrast between the sources. And while I usually don't like to gel blue for night, I did use a bit of CTB for this film to make it a bit more theatrical. It's not something that I would ever do for a realistic situation.

"There is one night scene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"I've been given a gift working on *NYPD Blue*. The inspiration comes from the top. Steven Bochco and David Milch consistently take television to the next level and inspire us to push the envelope. I think of my camera as a character. That affects the point of view. We strive for imperfection in camera movement and lighting because that augments the reality of the stories. There are subtle things that make the show feel like New York. I noticed how beautiful light can cascade through the little narrow cracks in between buildings. There is humidity in the air, and hot shafts of light seem to radiate in the middle of the street. The brightness makes everything else seem darker. We emulate that feeling. We aren't breaking new ground for its own sake. It's like climbing a mountain. You keep finding new things that add to the drama and visual impact. It's not a homogeneously lit show. It's a textural thing. People are coming into and out of shafts of light. That's important because real people don't walk around in a 45 degree keylight all day. I trust my eye and instincts. I'm willing to take chances and judge light by the fill rather than the key side of the image. I feel lucky to be working as a cinematographer today. We have the tools to be interpretive. We can see scenes through the perspective of our mind's eye and capture them on film. I'm aware that our stories can dramatically affect the way people feel, think and act. That's an awesome responsibility. I'll never take it lightly."
Brian J.
Reynolds
Brian J. Reynolds has earned three consecutive ASC Outstanding Achievement Award nominations and an Emmy nomination for *NYPD Blue*. His other credits include *Civil Wars* and *Guarding Tess* and numerous TV commercials.
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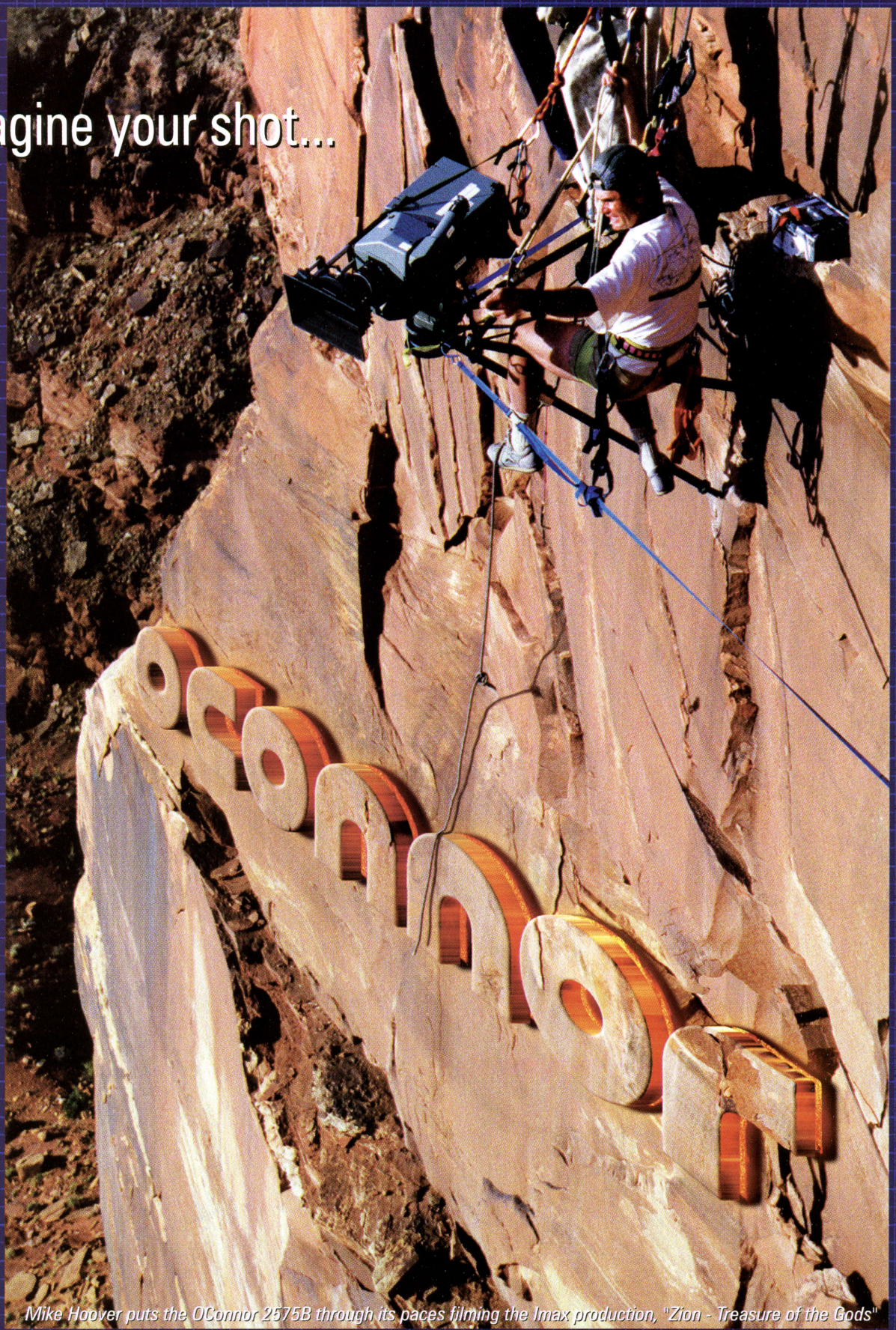
where Jeremy Irons and Liv Tyler are smoking a joint outside the little cottage near the house, whispering to each other about sex. The light was very low-key, coming from inside the cottage and from a crane we set up to light the landscape behind them. But I underexposed it to the point where you can just see a few olive trees in the background; it was low-key to the point of being frightening."

Interestingly, this intimate tale will also benefit from 2.35:1 framing, taking advantage of the sprawling Tuscany landscape as well as facilitating the coverage of dialogue scenes. Says Khondji, "This film is all about emotion and the build-up between characters. With no doubt this is the most character-driven film I have done. But as our location is treated as a character of its own — the textures of the hills, the colors, the sky — I felt using 2.35:1 would help us with that approach."

Opting against shooting in anamorphic, which he had used for his films before *Seven*, Khondji suggested that *Stealing Beauty* be shot in Super 35 after his positive experience he'd had with that process on the David Fincher film. In addition, the benefit of a lighter camera weight was a bonus for the completely location-shot film. The general use of 5245 and 93, meanwhile, would aid in reducing any grain created in the optical process.

Says Bertolucci of the decision, "It was really the fear that the scale of the film was so small that convinced me to use Super 35 rather than anamorphic. It balanced with the feeling of lightness we wanted." Pausing, the director laughs and adds, "It was as if Vittorio and I had shot *The Last Emperor* in 16mm."

Considering the lessons he learned on *Stealing Beauty*, Khondji concludes, "It was a fascinating process to shoot with Bertolucci's inspiration. It was like working with a modern master of painting. Also, I learned not to be frightened of exteriors. I had only done extensive exterior work before on *Before the Rain* and for a few sequences in *Seven* — that's all I had behind me."



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The Rock Offers No Escape

Director Michael Bay and cinematographer John Schwartzman join forces to assault viewers with a hyperkinetic, star-studded action extravaganza.

by Eric Rudolph

Above:
Bio-weapons expert Stanley Goodspeed (Nicolas Cage) emerges from the shadows. Says director of photography John Schwartzman, "I've never worked so close to the edge of blackness, sometimes too close."

The Rock is a contemporary hostage drama set at one of the nation's top tourist attractions: the former high-security island prison of Alcatraz. In the film, brigadier General Francis Xavier Hummel (Ed Harris) seizes the island and takes some tourists hostage to force the government to grant full benefits to the families of officers who were slain while under his command during covert government operations. If Hummel's demands are not met, he will launch a battery of rockets filled with highly toxic nerve gas at neighboring San Francisco. Enlisted to save the day are Stanley Goodspeed (Nicolas Cage), an FBI chemical and biological weapons expert with little field training, and John Patrick Mason (Sean Connery), a top-secret federal prisoner who has been incarcerated for years without trial.

Though *The Rock* may sound like a typical big-budget Hollywood action movie, this $70 million picture offers a decidedly different method of putting exciting, kinetic images on the screen. High-octane visuals are a staple in the cinematic vocabulary of Michael Bay (*Bad Boys*), the 32-year-old director of *The Rock*, and he sought extra acceleration from cinematographer John Schwartzman.

"Our approach was to take an image and attack it," says Schwartzman. "We shook the cameras a lot in action sequences, by banging on dollies or shaking iris rods. When we used car mounts, I told my grips, 'Keep the bolts loose, we want these cameras to shake.' The action images are at times beautiful, and at times unforgiving in their mood, pace and relentlessness. This film is halfway to being like a *Back to the Future*-type of theme park ride. Not only will you will be stimulated by the story and the actors, but after seeing *The Rock*, you will want to go home and lie down for an hour because you've just been through something intense."

Schwartzman, a 35-year-old Los Angeles native, completed graduate studies at USC's film school and apprenticed with Vittorio Storaro, ASC, AIC on 1988's *Tucker: The Man and His Dream*. He then shot some smaller features before a successful run shooting commercials and music videos for Propaganda Films with such directors as Jeremiah Chechik (*Diabolique*), David Fincher (*Seven*), and his former classmate, Bay. Schwartzman later tackled the mainstream features *Pyromaniacs: A Love Story, Airheads, Benny and Joon* and the recent comedy *Mr. Wrong*. The cinematographer had never worked on an action picture before, but Bay chose him because "he is conscientious, a fast lighter and not afraid to take chances."

Says the director, "*Benny and Joon* was John's best work, but it was so much softer than what I was looking for. I was scared he wasn't going to really push the edge the way I wanted. I kept saying, 'I'm going to be very pissed if we make this movie safe.' Well, he did an outstanding job, exactly what I wanted. It looks very rich, and he wasn't afraid to make it really dark and gloomy down in the tunnels that represent the underbelly of Alcatraz.

"I like to shoot a lot of setups, push the lighting, make things dark, put cameras in odd positions, move the camera with strange dollies and use weird perspectives. The crew on *Bad Boys* [under cinematographer Howard Atherton] actually said, 'This is never going to cut,' but it did; it's just a different style of filmmaking."

Schwartzman concurs, "On *Benny and Joon*, we were going for the sense of late afternoon on a lazy summer day, with the sun streaming in through the windows. We tried to paint with light to make all of the characters look a

little more romanticized than they really were, and for that movie it worked.

"On *The Rock*, we were constantly breaking screen direction and eyeline rules. When Michael says dark he means it. I've never worked so close to the edge of blackness, sometimes too close. We worked in the tunnels with three footcandles, but I was exposing for 25. There were no actual lights at all in these tunnels; fortunately there was a little water kicking a sheen on the wall from the backlighting, so it was not totally black. We used just enough backlight so that you could see the outline of the guys all wearing black at night. There is logic to this; the Army spent $30 million developing these camouflage outfits, so of course you can't see them!"

The years the duo spent shooting commercials together for Propaganda paid off; they came to the set with an established working method that put them in sync artistically from the get-go. Recalls Schwartzman, "If I saw a room with big windows, I would know instinctively that he would want to bring five arcs through the windows this way. I know the camera's going to be at this end of the room, because he's got a great eye and the room only looks good from this side. That allowed me to be ready to go first thing in the morning.

"If I knew we were going to be shooting upstairs in the Alcatraz infirmary, I'd have the scissorlifts in position with either five Dinos or five brute arcs on them, depending on the look we were going for, so when he walked in, the lighting was pretty much there; it was just a case of, 'Where are the actors going to stand and how are we going to finesse this?'"

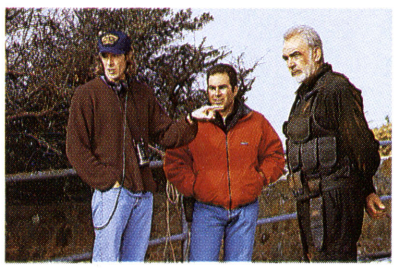
Schwartzman details, "Our approach to lighting a room was to light it the way the light would naturally fall, and then block the actors around it. We didn't try to fight the natural light, we tried to enhance it. We didn't try to push the boulder up the hill, we tried to ride it down."

The overall lighting design also favored the use of small sources whenever possible. At the same time, Schwartzman wanted to produce enough light to remain at a T3.2 for the sake of depth of field. However, as with the rest of the photographic approach on this picture, the methods often ended up being unconventional.

Explains the cameraman, "One of my favorite key lights consisted of one-inch mirror tiles Velcroed to a 4' by 4' piece of plywood, off of which we would bounce Par lights. At times this effect would be beautiful and at times unforgiving, but it enhanced the story. We'd also move light sources as if the sun was moving. We didn't want to be too obvious, just a little different. Michael likes to take a sharp point of view. Besides, you could light Ed Harris, Sean Connery or Nick Cage with a road flare and women would still say they were sexy."

Schwartzman acknowledges that Bay not only composed most of the shots, but often operated the camera himself. The cinematographer offers that the director's "intense involvement" in imagemaking was liberating, allowing Schwartzman to focus all of his energies on lighting concerns. "On a lot of *The Rock* I would deal with the lighting and let Michael and operator Mitch Dubin decide whether they were going to move the camera up or down three inches from where we had initially set it, and then I'd come back and check it before we rolled," he says.

One explanation Bay has for operating the camera himself is his fondness for the "poor man's process" when shooting actors driving in car chases, which he developed during his music video days. He explains, "There's a major car chase in *The Rock* in which Connery is driving a Humvee and Cage is driving a Ferrari through the hills of San Francisco. It's a violent, kinetic and destructive chase. The Humvee is like a tank on wheels; when it hits a car, that car is demolished! I film actors driving in these scenes from a dolly a few feet in front of a stationary car. I do whip pans and whip zooms and violently shake the camera, trying to make the whole screen rumble. Used in snippets, it looks as if the actors are driving ferociously. These driving scenes are normally done on a camera car, but if I'd



Below: ***The terrorist team lead by Gen. Hummel (Ed Harris, center) lounges in the Alcatraz infirmary. Dinos and arcs on scissorlifts augmented the location's natural lighting — a strategy Schwartzman (at left, between director Michael Bay and actor Sean Connery) used throughout the production.***

Mayhem is the order of the day on location in San Francisco as a cable car is launched skyward during a chase sequence. Schwartzman added camera shake and rattle to enhance the action.

done that on *The Rock* it would have looked really lame. I also do this in quite a number of my action scenes. Our operators, who were great, would say, 'Well, you're the best at that, so you should do it.'"

Despite Bay's penchant for fast-paced, quick-cut shots, the various locations in *The Rock* were rendered in distinct photographic styles. Explains Schwartzman, "The Alcatraz interior sequences are mostly handheld and very edgy, with extreme high and low angles. The scenes in the sewers and tunnels below Alcatraz remind me of the first *Alien* film. In the Pentagon and the White House, the look is clean and classical. The San Francisco scenes are more traditionally slick, action-picture photography. Overall, the film is a blend of classical widescreen with a hip commercial feel and a lot of visceral, somewhat self-conscious camera movements."

Transferring all of this vigor onto the screen required great energy expenditures from the crew. Schwartzman likens the exhaustion level on *The Rock* to that of "doing a documentary on Mt. McKinley!" The difficulty of the shoot (six days a week for six weeks) was compounded by the fact that Alcatraz, a Civil War fort built in the 1850s and made over as a prison in the 1940s, wasn't designed with the needs of a film crew in mind.

"On all but the most bizarre of locations, you take for granted that you can at least get a golf cart, a forklift and an elevator," says Schwartzman. "Well, not on Alcatraz. All of the lenses and cameras had to go down six flights of stairs and then a quarter-mile around to the front of the island many, many times; the camera crew got beat up pretty good. I lost seven pounds during the shoot, and that was about average. Just walking from the boat to where we would be shooting most days was the equivalent of climbing up the stairs in a 13-story building. And we moved around a lot, according to the weather, which would often change five times an hour."

As one of San Francisco's most popular tourist attractions, Alcatraz is inundated daily by tens of thousands of visitors a day, all of whom generate a great deal of money for the city. The Parks Service wasn't about to shut down the site just to suit the needs of the production crew, so arrangements were made to shoot around the teeming tourists. Most areas were off-limits, but on a Saturday shoot, there might be some 40,000 people milling about. The production team was also frustrated by the fact that they were forbidden from altering the prison in any way whatsoever.

"It was like shooting in the Louvre," says Schwartzman. "We were working in a place that we couldn't touch. It is a living monument to the old horrible prison, the paint is peeling everywhere, and we couldn't attach anything to anything there, or scrape off any paint from the interior or exterior. We had to treat it as if it were a Fabergé egg. That's tough when you're doing an action picture with machine guns and people running around with hand grenades! We could never say 'Lets put a plate up for a light here.' We always had to find ways to rig that were totally non-invasive."

This "non-invasive" technique required Schwartzman and crew to construct riggings tailor-made for the layout of the historical landmark. "As a result, we had to take extraordinary measures. For Alcatraz, we built the weirdest rigs in the world so we could have the camera zipping through holes

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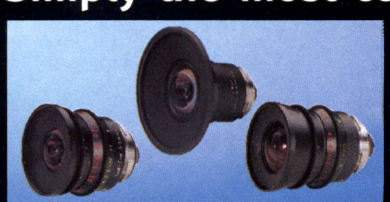

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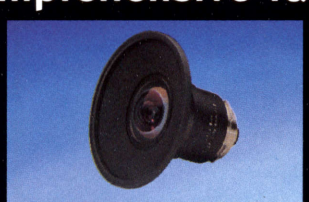

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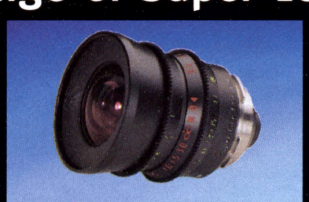

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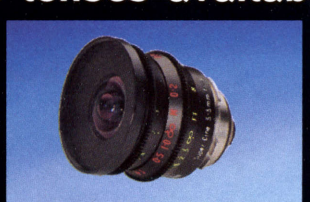

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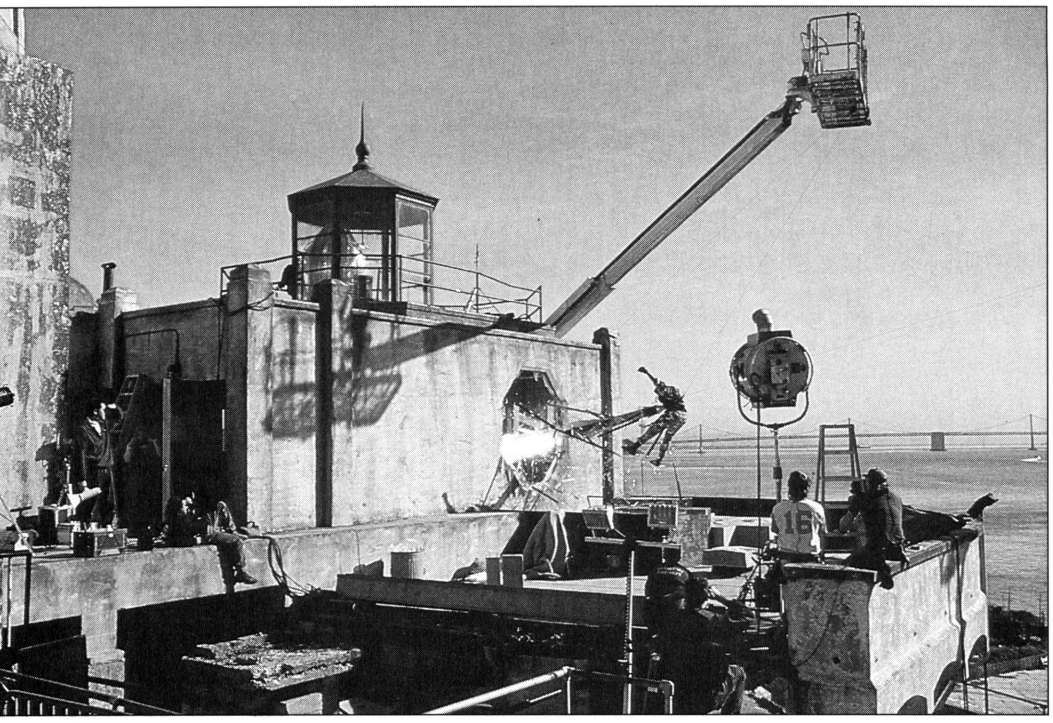

Above: ***On* The Rock*'s prison-isle location, a stuntman is harpooned by a missile against an epic Bay Area panorama. Schwartzman notes that Alcatraz's constant stream of sightseers was the least of his problems.***
Right: ***An air cannon adds extra debris as a Ferrari wreaks glassy havoc in The City. Whip pans and zooms replaced standard camera-car work to add ferocity.***

in the walls," says the cameraman. "My B-camera and Steadicam operator, Chris Harhoff, designed an extra-long six-foot Steadicam post so he could run with his Moviecam Compact literally a half-inch off the ground. Jake Jones, our rigging key grip, had to cantilever weights to put a light through a window, and rig pendulums to lower lights over sides of walls, instead of bolting or screwing something into a wall or a ceiling."

With an average of 40 shots scheduled for each of their 12-hour days, a great deal of time and effort had to be spent on setting up equipment so that lighting the sprawling edifice would be less of a logistical headache than it appeared to be on the drawing board. Recounts Schwartzman, "The entire island was pre-rigged with 27,000 feet of cable feeding from five generators. It was one of largest packages assembled since *Terminator 2*. We had three 45-foot electric and two 45-foot grip trucks, which is more equipment than I've ever carried in my life, and which, like everything else, had to be lifted onto the island by aquatic crane. We had four full studio packages dropped at various sites, so we would just move the camera dollies and remote crane, because the lighting and power were already there. We needed the flexibility of

the pre-wiring and the duplication of gear at different Alcatraz locations to enable us to move around the island quickly, due to the demands of the schedule and the unpredictable weather.

"Some days we would shoot only three-eighths of a page, which might require 37 setups, because that is how Michael shoots his action, or because it is was a complicated sequence, such as Nick Cage disarming a bomb. Other days we would shoot four pages in two-thirds of a day; for example, if it was a walk-and-talk around the island and we did it on a Steadicam. We had actors who could play those scenes in one take. You didn't have to find ways to work around them; their artistry and professionalism let us do whatever we needed. With actors like Sean, Nick and Ed, and crew members like Chris Harhoff, we could put the 40mm on and say 'Let's walk from here to here, do this whole scene, punch in for two singles here and call it a day.'"

Bay's desire for scope demanded the use of extremely wide lenses. This, coupled with the impractical location, called for creativity in the placement of fixtures. "There was not a lot of room to hide our special riggings because we used the 17.5mm and the 21mm lenses so much," Schwartzman says.

To accommodate the breakneck pace of Bay's aesthetic, Schwartzman had to run multiple cameras constantly, even for those scenes low on the kinetic quotient. "We always ran multiple cameras — at least two, often three, and up to as many as nine. That is not something I, or any other cinematographer, loves to do, especially since a lot of times the A-camera would be outfitted with a 17.5mm lens and the B with a 150mm or a 300mm. But because Michael has such a strong sense of what he wants to do, he was always looking for very specific snippets from the additional cameras. I might have a 17.5mm master plus a 300mm shot of a guy's hand dialing a phone that Michael knows he's going to need. It's not like we were getting double coverage all the time, but we were always picking up pieces that way.

"Michael was always trying to work in a third camera, until I would finally say, 'No, you can't.' Many times the B-camera would suffer, because, of course, the shot was lit for the main camera. Michael promised me that if something he wanted from the B-camera didn't look good, he wouldn't use it. He'd say, 'I'm looking for one little piece that I think will work in this lighting setup; I promise I won't use anything else.' Knowing Michael has

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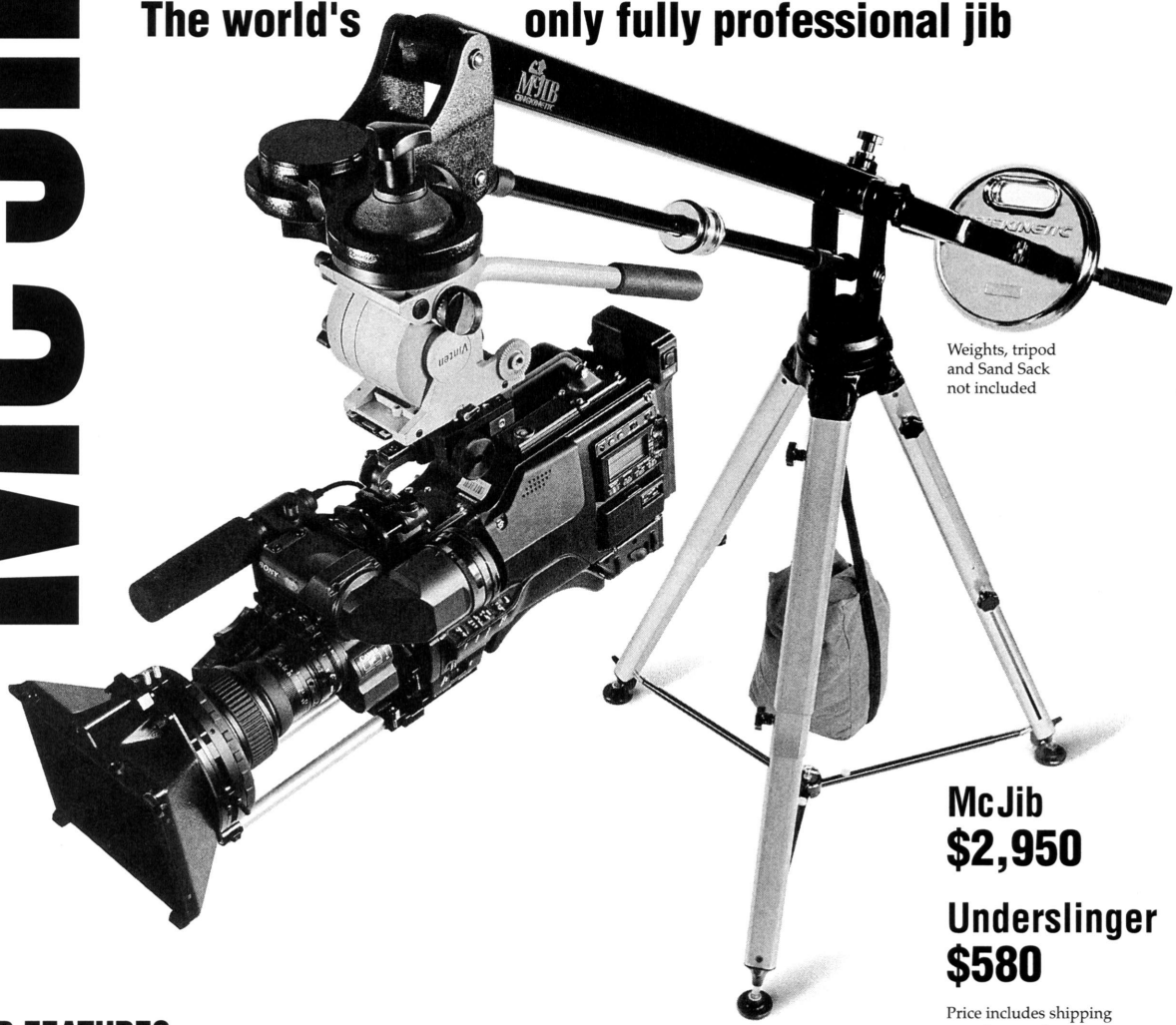

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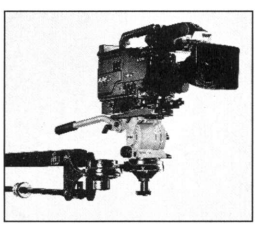

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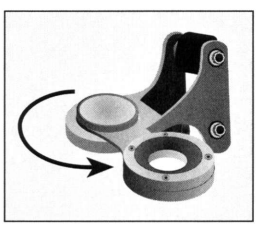

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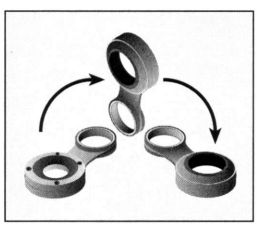

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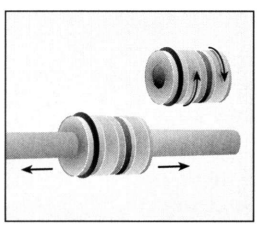

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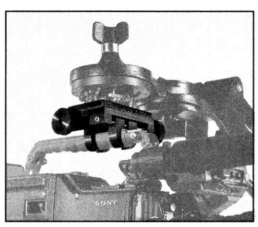

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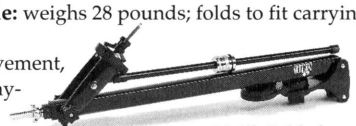

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The soggy tunnels under Alcatraz offered difficult shooting conditions. Schwartzman notes, "There were no actual lights at all in these tunnels; fortunately there was a little water kicking a sheen on the wall from the backlighting, so it was not totally black."

such a strong visual sense, I was of course confident he wouldn't put anything in the film that didn't look great."

When the production left Alcatraz to film in San Francisco, it did not mean that the island could be forgotten altogether. Lit up like a Christmas tree, the island often shone like a beacon in the background of the city-based scenes. "A lot of times when we shot in San Francisco we had all of Alcatraz lit so you could see it clearly from town, using a half-dozen 12Ks and 100 Par cans with a couple of generators running," Schwartzman notes. "Part of the power of the story is the proximity of the threat, the fact that Alcatraz is only eight minutes by boat, just 1,500 yards and a short rocket blast away from the city. When we did the big car chase, as we panned with a car racing through an intersection, Alcatraz was right there in the frame; you felt you could reach out and touch it.

"There were nights when we would be shooting in a warehouse on a pier overlooking Alcatraz, where the movie FBI had set up its command headquarters, and we had Alcatraz completely lit up so that it was in the background in those scenes. At the same time, I had an aerial unit shooting helicopters [provided by West Coast Helicopters] flying around the prison, and it was a matter of building up and controlling the light levels so it would work for all of the units. There were plenty of nights where we had 35 to 40 electricians on the island and in different parts of the city, just to keep it all together."

Resisting the obvious temptation to shoot the entire picture on Kodak's 500 ISO 5298, Schwartzman decided to mix and match stocks best suited for the dusky look Bay sought. "I tried to stay off of 5298 as much as I could," he says. "I used mostly 5293 for interiors and 5248 for exteriors. Those three stocks are so well matched, the mixture wasn't a problem. I hear about entire pictures being shot on 93, but using tiny flashlights as your only illumination doesn't work on 93. The 48 has a little more contrast than 93, so when we had foggy San Francisco weather the 48 would give us some contrast back. I also found that exposing the 48 one stop under looked great."

Schwartzman adds. "For the first three weeks you're just struggling to get the timer to make it right, but if I had been in town, I might have thought about flashing certain scenes, although I generally keep it straight."

However, concerns about optical process image degradation were not sufficient to dissuade Schwartzman and Bay from filming in Super 35. "We chose Super 35 mainly because Michael likes to use close-focus, wide-angle

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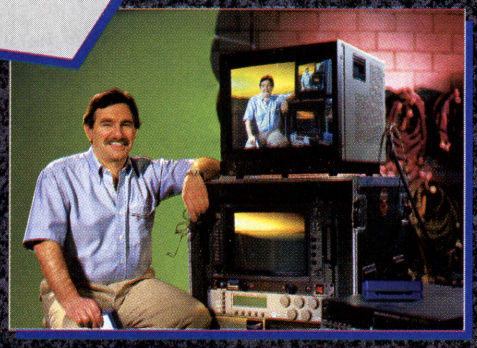

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lenses," the cinematographer says. "We lived on 17.5mm and 21mm close-focus; 50 percent of the film was shot with those two lenses, mostly the 21mm. The anamorphic equivalent to the 21mm would be a 40mm, and it would not be a close-focus lens. I knew our image quality could suffer because of the optical process necessitated by Super 35, but we got an incredible scope of view. We went for deep focus, a *Citizen Kane* kind of look, complete with low angles and practical ceilings."

> "I don't want to turn into some old guy who just shoots a movie once a year. I'd go crazy if I couldn't shoot every other week!"
>
> — Michael Bay

Bay had expressed some concern about the Super 35 optical printing step, but was buoyed by the image quality that cameraman Darius Khondji, AFC achieved for David Fincher's *Seven* [see *AC* October 1995], another Super 35 picture that made extensive use of darkness. Notes Schwartzman, "I really like how close you can get with the 17.5mm lens, and there's nothing comparable in anamorphic. Plus, I like to do things like snap this little skateboard-wheel dolly onto the camera and use a prism to get an even lower angle, and you just can't do that with anamorphic.

"We also used the Frazier lens system, Panavision's new infinite depth-of-field lens, which holds focus from the lens surface to infinity. We have one shot where someone is holding a gun right up close to the camera. Normally you would have to rack-focus from the gun to the actor. But with the Frazier, it's all in focus — from the gun, which is a quarter-inch from the front lens element, to infinity."

In addition to working primarily with wide lenses, zooms were also used, albeit sparingly. "We carried a short Primo zoom and the 11:1," recalls Schwartzman. "We only used

them for day exteriors, when we had to move quickly to get a good stop, and to give the camera guys a little break. People can get really lazy and just set up a zoom and move back and forth. For our purposes, the short primes were great because the focal length isn't going to change; that's good for lighting. And of course, the less glass we had on the camera the better, because we had a lot of small light sources, and the primes enabled us to avoid a lot of flare. We shot near a giant blast furnace and had no flare problems at all with the primes."

"Panavision says their zooms are as sharp as their primes, and I agree in the best case, but we were always in the worst case!" Schwartzman points out. "Also, we needed to stay light, because of all of our camera movements. We mostly used 200- or 400-foot magazines; rarely would you have seen the camera fitted with a 1,000-foot magazine and a zoom on the set of *The Rock*."

"The camera crew did an absolutely stunning job," he attests. "The first AC, Chris Duskina, did the most incredible focus-pulling job. And we had no scratches, even though we were always in crappy locations with dust and water and 14 rats running loose. The producers allowed me to have all the manpower I needed, and to let people who were exhausted take four days off and come back, which is an ideal situation for making a movie of this size."

With the arduous shoot of *The Rock* now a lingering memory, both Bay and Schwartzman say they will be going back to commercials for a few months. "They're a good way to stay sharp when you're not shooting a feature," says the cinematographer.

But the director offers his own reasons for the between-features work: "I don't want to turn into some old guy who just shoots a movie once a year," he says. "I'd go crazy if I couldn't shoot every other week!"

Cinematic Transcendence

The ASC and the Academy of Motion Picture Arts and Sciences honor 1995's standout feature-film cinematographers.

by Chris Probst

Photos by Andrew Cooper, courtesy of Paramount Pictures.

John Toll gave the English castles of* Braveheart *a more civilized look to contrast the primitive conditions suffered by the Scots. 20Ks with light grid cloth diffusion were the main sources for the sets designed by Tom Sanders and built at Ardmore Studios in Ireland.

THROUGHOUT THE YEAR, IT'S THE mission of *American Cinematographer* to cover, in soothsayer-like fashion, the year's most accomplished — and award-worthy — photographic achievements for the big screen. Inevitably, however, a few visual masterpieces recognized by both the Academy and the ASC slip through *AC*'s editorial net. In the interests of maximizing our coverage of the year's finest feature-film cinematography, we hereby present in-depth coverage of the ASC- and Academy-nominated works that were not the subject of earlier feature stories in the magazine.

A total of nine films were nominated by the two organizations for their photographic achievements, with ASC recognition going to Dean Cundey, ASC for *Apollo 13* (covered in the June '95 issue of *AC*), Stephen Goldblatt, ASC for *Batman Forever* (July '95), Jack Green, ASC for *The Bridges of Madison County* (August '95), Darius Khondji, AFC for *Seven* (October '95), Dariusz Wolski for *Crimson Tide*, and John Toll, ASC for *Braveheart*. The Academy's nominees included Goldblatt and Toll, as well as Michael Coulter, BSC for *Sense and Sensibility*, Emmanuel Lubezki, AMC for *A Little Princess*, and Lu Yue for *Shanghai Triad*.

Since the work of Cundey, Goldblatt, Green and Khondji has already been detailed, the following pages are devoted to Messrs. Toll, Coulter, Lubezki, Wolski and Yue for their respective works.

Braveheart
John Toll, ASC
ASC and Academy Award winner

The hurdles faced by the production team of *Braveheart* were not nearly as insurmountable as those confronted by the film's protagonist, William Wallace, the legendary Scottish freedom-fighter who freed his nation from the reigns of English tyranny. Still, the three-hour plus historical saga did face a grueling 105-day shooting schedule in the oft-unpredictable climates of Scotland and Ireland. Those factors, coupled with several

sweeping battle sequences featuring thousands of sword-wielding extras, tested the very marrow of the filmmakers' determination and passion.

"Right from the beginning, *Braveheart* was a film that had spirit," says director of photography John Toll, ASC, who also earned this year's BAFTA Award for his staggering accomplishments on the film. "Most of that spirit came from the director, Mel Gibson. This was only the second film that he directed, and it was huge. But to be able to direct as well as act in it — and do such a great job in both categories — was nothing short of phenomenal. I'm

amazed that he was able to pull it off and still keep his sense of humor. Mel had an enormous amount of fun making the movie and he inspired everybody to work that much harder. But he was working harder than anybody else in the movie because he was doing *two* extremely difficult jobs. He was in the chair at six in the morning, and if he wasn't thinking about staging sequences or shaping his performance, he was out there actually swinging a sword around or running across the field. It was unbelievable."

Written by Randall Wallace and set in barbarous 13th-century Scotland, Wallace (Gibson) unites his country's warring clans and mounts a campaign to save his people from the occupying English forces of King Edward I (played by veteran British actor Patrick McGoohan). Even against this turbulent backdrop, however, the film is grounded in its characters.

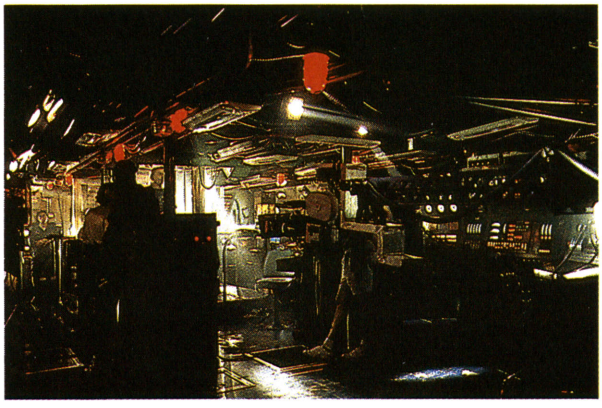
"My preconception from reading the script was to have a very natural, stark sense of reality," reveals Toll, who also earned last year's Best Cinematography Oscar for *Legends of the Fall*. "The nature of the story really lent itself to that kind of a treatment — it not only takes place in the Middle Ages, but a very rough and uncivilized part of the Middle Ages. So in my mind I wanted it to feel very rough, raw, stark, dark and graphic — almost primitive. The personalities and people who existed in that environment were very sympathetic characters, and *Braveheart* is a very heroic story. So the idea of these types of characters coming out of that environment was really attractive to me."

The rebellious Scots pay a fire-lit farewell to the fallen. Upon first reading the film's script, Toll (far left) imagined the film's 13th-century world to have a "raw, stark, dark and graphic" aesthetic.

Toll and Gibson soon found that each shared the other's visual ideals and objectives for the film. "When I met with Mel and we discussed how the picture should look," the cinematographer explains, "he would talk about the story and certain sequences — especially the battles — in a way that told you he had thought about it a lot and could really see how they would play in the film. He was very eager to make *Braveheart* a rough, gritty and realistic picture. So it became our intention to immerse the audience in the 13th Century — to use all of the visual elements to tell the story in a way that would surround them with the look and feel of a rough and primitive medieval Scotland.

"We were blessed with a very talented creative team that Mel had assembled — production designer Tom Sanders, costume designer Charles Knode and makeup artists Peter Frampton and Lois Burwell. All of them were fully on board with Mel's ideas about the look of *Braveheart*. When I arrived for prep, Tom had already begun the construction of the village in Glen Nevis, Scotland, which is near Fort William, an area with more rainfall than anywhere in Europe. It was a great location; there were spectacular visuals everywhere and the village was brilliantly designed and built, so there were no angles in there that you couldn't shoot. The production design, art direction, costumes and makeup were all designed to blend into the village, into that particular environment. But there was also the enormous amount of rainfall and the ankle-deep mud it created, which only added to the effect. When you stood in that village, you believed it could have always existed there and you had a sense of what life in the 13th Century might have been like."

The production spent six weeks in Scotland filming scenes in the village — those featuring Wallace as a young boy and a later sequence involving the overthrow of the local magistrate. During this time, the capricious Scottish skies wreaked havoc on the filmmakers, alternating from overcast to brilliant sunlight to quick flashes of rain within the course of a day. Toll cringes at the memory of the haphazard elements, recalling, "You'd wait for it to clear, the rain would stop, you'd start shooting until the sun came out, stop shooting, wait for the sun to go back in, it'd become overcast again and then you'd shoot your brains out while it was still overcast — until it started to rain again! That was the typical pattern."



**Clockwise from top left: *Michael Coulter, BSC's vision of romantic simplicity for* Sense and Sensibility; *the magic reality designed by Emmanuel Lubezki, AMC for* A Little Princess; *actress Gong Li, luminously depicted by Lu Yue in* Shanghai Triad; *the high-tech interior of the* U.S.S. Alabama *depicted by Dariusz Wolski in* Crimson Tide.

Toll shot with Panavision cameras outfitted with E- and C-series anamorphic lenses, utilizing Eastman Kodak's 100 ASA EXR 5248 for most daylight exterior scenes, 200 ASA 5293 for dusk and lower light-level exterior shots, and high-speed 5298 for the interiors and nighttime exteriors. "I decided to shoot overcast," he recounts, "because if we didn't, we'd still be there waiting for the right light. However, even though it was overcast, sometimes the light would change within the overcast look because it would be coming through two to five layers of clouds. We'd get light changes of two, three, and sometimes four stops with no apparent change in contrast!

"The overcast light was very flat, so for tighter shots I would try to build contrast with HMIs either bounced or coming through grid-cloth on one side and use large blacks for negative [fill] on the other. At times, though, it became difficult because of the light changes. As we were attempting to balance to one level of overcast, it would change and we would need to start over. It would finally stay constant for a short while, and you'd be happy with a certain balance, but before too long, it would change again; it would still be overcast, but the light level of the foreground would change drastically in relation to the background. We constantly seemed to be out of balance, and it was maddening! At one point I stopped using lights because they were doing more damage than helping us. I just used large white and black [bounces] to control ambient levels when we could work them close enough."

Perhaps the most memorable of *Braveheart*'s many attributes are the much-lauded battle sequences — which were criticized by some for their extreme violence. Gibson felt it essential to portray the sheer visceral savagery of the battles in a fashion historically accurate to the warfare practices of the period. Wanting to provide audiences with an experience they'd never seen before, Gibson and Toll watched a near-definitive compilation of battle scenes — affectionately dubbed the "carnage reel" — assembled from films spanning the history of cinema. Says Toll of their research, "It's surprising that you remember all of these wonderful pictures being unbelievably spectacular, but when you really start to look at them, many just don't hold up. There was very little that we saw that made any sense at all or suggested a style that was appropriate for us, although anything that Akira Kurosawa did in terms of the scope and epic sense he generated was very impressive. Also, Orson Welles did a picture called *Chimes at Midnight* [1966] — which I wasn't familiar with until I started this picture — in which the battle sequences were very spectacular. The editing techniques that he used were very contemporary. It was exactly the direction we were thinking about going.

"Mel wanted these battles to be down and dirty," Toll specifies, "to convey the sense of chaos and horror that came out of this type of warfare. We wanted to create a sense of immediacy and make the audience feel as if they were participants, that they were witnessing the battle from close range. I thought handheld cameras would work well for that. First, they would give us flexibility. We could go anywhere and get out of the way quickly if necessary — as we

Photo credits clockwise from top left: Clive Coote, courtesy of Columbia/TriStar Motion Pictures Companies; Murray Close, courtesy of Warner Bros.; Richard Foreman, courtesy of Hollywood Pictures Company; courtesy of Sony Pictures Classics.

did when working around the falling horses. Sometimes, the problem of shooting action is that you really see too much. Part of re-creating the battles was to just have fragments of information and impressions as much as just a mere graphic display — almost the idea of documentary combat photography. I really wanted the audience to feel that they were more participants than spectators. It's the difference between watching a football game in a stadium and being out in the field. I wanted the audience on the field, trying to avoid being hit, rather than sitting up there in the grandstands. The handheld cameras gave us that."

The cinematographer chose to cover the battle scenes (shot at the Curragh and Ballymore estates in Ireland) with as many as six camera teams simultaneously filming different fights. The various units were headed by Toll, operators John Clothier and Klemens Becker, second-unit director of photography Ray Stella, and Irish operators Vic Purcell and Sean Corcoran. Says Toll of his strategy, "We went to longer focal-length lenses partly because I wanted to make it harder to get perfectly composed, steady images. I was constantly urging the operators not to do perfectly composed shots, but to stay loose and follow the action instinctively rather than by design. The idea was to make the audience think they were within a battle taking place between thousands of combatants. So part of the use of the long lenses was to compress the action and keep the frame filled with people.

"The most extras we ever had was 1,500," he continues. "But we were working with anywhere from 200 to 500 for the fight sequences. When we'd shoot fights involving Mel or one of the principal actors, I'd usually have three cameras covering it: a 180mm for a tight shot, a 100mm for a medium shot and a 35mm low on the ground, all handheld. The 100mm and 180mm would be higher cross-angles to include the crowd in the background. We'd then fill the background with up to 300 or 400 people. So while Wallace would be fighting three or four guys at once, there would be 200 other fights going on in the background! And they couldn't just be guys waving swords around in the air, they had to be fighting! It was an enormous task to keep that going every day. [See *AC* December 1995 for details on how digital effects helped multiply extras into Wallace's army.]

"[American stunt coordinator] Mic Rogers and [English stunt coordinator] Simon Crane had a core of 30 or 40 stuntmen that we'd have in the immediate background. Behind them would be this troupe of Scots called the 'Wallace Clan,' who have trained themselves in medieval warfare and travel around Scotland performing at fairs, and finally we had reservists from the Irish Army in the third rank behind them. So we were getting great fights from action staged primarily as background for the principals. There were two additional cameras concentrating solely on these fights. Part of the overall scheme was to provide the film editor, Steve Rosenblum, with as much material as possible so he would be free to build the fight sequences however he wished. One really great aspect of this was that because we were trying to create this sense of chaos and confusion in battle, continuity and screen direction became relatively meaningless."

To confront the logistical challenges of mounting such coordination-intensive shots, communication and syncopation between all departments became an essential ingredient in executing Gibson's vision. Explains Toll, "It was the responsibility of David Tomblin and his staff of ADs to coordinate all this activity and provide the necessary ingredients on a short notice. Everyone did a fantastic job. We were shooting three, sometimes four fights in detail simultaneously — all with huge backgrounds. We never would have been able to get the variety and volume of material we did without the support from the mostly British and Irish crews. The armor, props, special effects, costumes, makeup, hair and sound people were constantly working on every shot to give us as many options as possible."

As Gibson and Toll waded through the two weeks of draining battle work, the team developed a keen eye for optimizing the choreography, composition and movement within the frame — often making changes in the frame rate to enhance an individual shot. Toll explains, "What we discovered early on, especially on the handheld shots with the long lenses, was that the movement was too fast. The combination of intentionally unsteady handheld cameras, a longer focal length and really fast movement made things happen so fast that you would miss it. So we slowed it down minutely. Because Mel was directing as well as performing, we were constantly looking at video playback, and at normal speed you could tell it was just a bit too fast. So we'd overcrank slightly — using speeds like 28 fps, maybe 30 fps at the most — and really got a knack for it. We'd look at a shot and say, 'I think that should be 27 frames.' We actually started to see a difference between 27 and 28 fps or 28 and 29 fps. Mel got especially good at it and loved to play with it because he really had a sense of how it would cut. It had everything to do with focal length, so we'd slow the 180mm shots down to 28 fps, 100mm would be at 26 fps and the 35mm wide-angle, which was usually on the ground, would be 22 or 23 fps. It all fell right into place."

For scenes taking place in Edward I's London castle, which was constructed by Sanders at Ardmore Studios in Ireland, Toll set out to counterpoint the visual scheme he had developed for the Scots. He explains, "We wanted the castles to be more civilized and have a different photographic style from what happened in Scotland, which was the rough, stark and primitive. England was the more sophisticated side of life in those times. It was a cleaner environment and the light there was more controlled."

With *Braveheart* both a critical and financial success that has earned a handful of trophies for both Toll and Gibson, the filmmakers have achieved something others can only dream about. Still, for Toll it's the work that matters. "Every time I see it, there's something about the last half hour of the film that just completely transports

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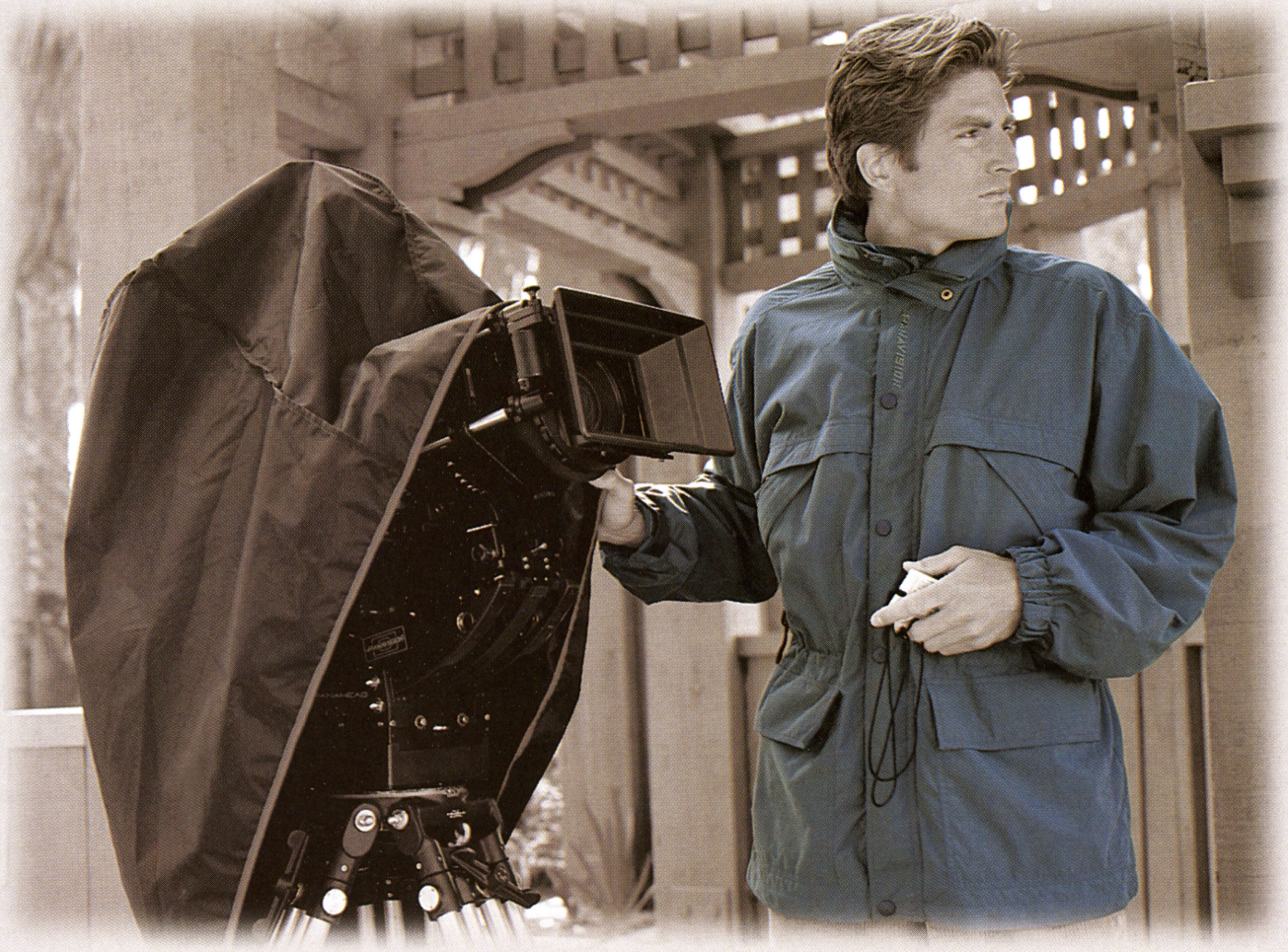

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me to another place," he states with smile. "Mel's attitude and personality during the production imbued everybody with the spirit of the film and made *Braveheart* really spectacular not just in terms of scope, but in terms of having the opportunity to work with such a talented group of people who put their creative energy into the picture. There's also the fact that it was such an international effort involving people who will probably never work together again as a unit. It was the type of film that you hope to be a part of again someday."

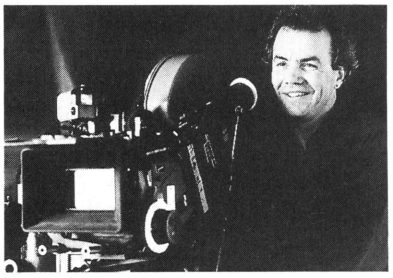


Photo by Clive Coote.

Sense and Sensibility
Michael Coulter, BSC

Tackling a genre seemingly reserved for Merchant-Ivory productions, producer Lindsay Doran defied the stigma of the "Hollywood" film to bring actress/screenwriter Emma Thompson's witty adaptation of Jane Austen's classic 19th-century novel *Sense and Sensibility* to the silver screen. Doran made another unusual move in hiring Taiwanese director Ang Lee (*The Wedding Banquet* and *Eat Drink Man Woman*) to craft the tale of love, restraint and familial bonds.

"Jane Austen is a wonderful painter of family rituals and social customs," says Lee. "Her work combines warm-hearted romance and drama with a sense of social satire, qualities I try to achieve in my own work."

The film's director of photography, Michael Coulter, BSC, had a straightforward idea of how to achieve *Sense and Sensibility*'s visuals. "The basic visual idea in the film was simplicity," says the cinematographer, who earned his first Academy Award nomination for his work on the picture.

A native of Glasgow, Scotland, Coulter developed an interest in photography after receiving his first still camera as a gift at the age of 15. A brother-in-law involved in small documentaries and children's films managed to get the eager young Coulter a job at a small film company, where he performed almost every task: assisting on cameras and lighting, recording sound, editing and eventually shooting. "I never did attend film school," reveals Coulter. "There wasn't much choice back then in the early Seventies. But during my first four years with the documentary company, I was able to do just about everything, so I got an overall feel for the technical aspects of filmmaking, albeit on a very small scale."

Coulter subsequently shot several documentaries with Scottish director Bill Forsyth, for whom he later photographed three features: *Housekeeping*, *Breaking In* and *Being Human*. Coulter's other credits include *No Surrender*, *The Long Day Closes*, *Spalding Gray's Monster in a Box* and *Where Angels Fear to Tread*, as well as *The Good Father* and *Four Weddings and a Funeral* for Mike Newell and *The Neon Bible* for Terence Davies. He's currently shooting the feature *One Golden Afternoon*.

Discussing his feelings about *Sense and Sensibility*'s cinematography, Coulter states, "I like the lighting in general to feel real, and this was an opportunity to approach something from a very naturalistic point of view. Ang Lee and I worked on the premise that people's lives in the 1800s were still very much governed by nature. During the day, they lived and worked by the light from windows; at night, they lit candles and fires and gathered around them."

Comments Lee, "I'm not interested in making a situation comedy that could take place anywhere or at any time. The more specific the setting and period, the more vividly the characters come to life. Even though the story is set 200 years ago in another land, Marianne [Kate Winslet] and Elinor [Emma Thompson] are so wonderfully alive that we cannot help but identify with them through our laughter and tears."

In depicting early 19th-century Britain, Coulter says that he, Lee and production designer Luciana Arrighi (an Academy Award winner for her work on *Howard's End*) based some of their cinematic ideas "on visual references from the Dutch masters of window light, painters such as Vermeer."

Coulter, who bridges his time between feature films by shooting commercials, says that his Academy Award nomination for *Sense and Sensibility* took him by surprise. For the immediate future, he wants merely to further his skills at creating believable images. "I think cinematography is somewhere between an art and a craft, *or* art and industry," he offers. "Sometimes when you look around on a set and see all the lamps, flags, and dollies, and your crew working for a shot that you've set, you think, 'My God! Where did all of this stuff come from? I thought this was just a simple shot!' It's then that you realize that your little piece of art needs a lot of industry to support it."

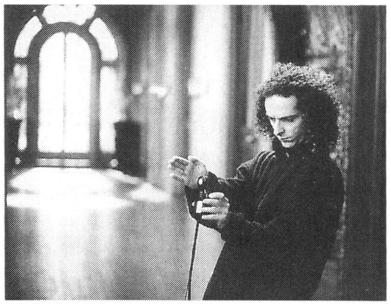
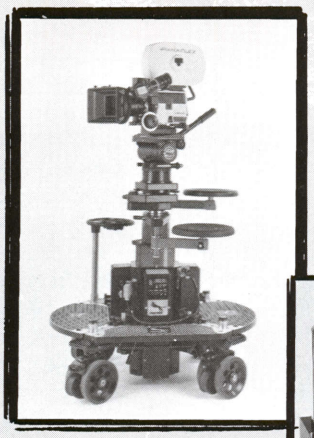


Photo by Murray Close.

A Little Princess
Emmanuel Lubezki, AMC

With its sophisticated and elegant production design, hypnotically sumptuous photography and emotionally stirring narrative, the film translation of Frances Hodgson Burnett's classic novel *A Little Princess* captured the magical sense of childhood wonder that had endeared millions to the book. The critically praised motion picture was directed by Alfonso Cuaron and stunningly photographed by Emmanuel "Chivo" Lubezki, AMC.

"When I saw the movie," says the young cinematographer, "I didn't even remember shooting it. It was the first time that had happened to me. The music, the images, the acting, and the editing all blended together, and suddenly I



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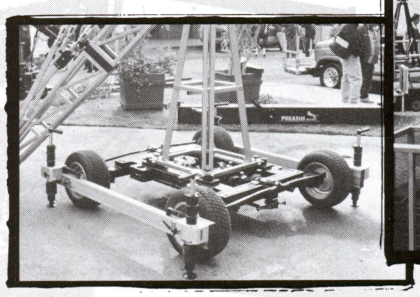

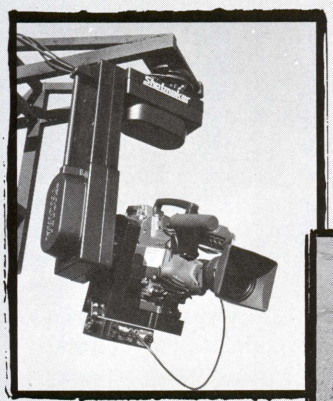

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was trapped in the movie. It was a great feeling; I must have cried three times."

Born and raised in Mexico City, Lubezki developed photographic aspirations at the age of 12, when he began taking black-and-white stills. Later, as a cinema student at Mexico City's National University, he gained his first real experience as a cameraman. "Most of the people in my generation wanted to be directors or writers," Lubezki points out, "so I did most of the cinematography work for the people in my class. That's where I really learned the basics — by shooting a lot of film and basically destroying most of my friends' work!"

Lubezki went on to photography his first feature, *Bandidos*, which he co-produced with an old classmate, and quickly established himself in the Mexican film industry by shooting such films as Alfonso Arau's *Like Water for Chocolate*, *Miroslava* and *Amber* — all three of which earned the cinematographer an "Ariel," the Mexican equivalent of an Academy Award. He was not only the youngest recipient of the award, but also the first person to be honored for three consecutive years.

The cameraman first caught Hollywood's eye with his work on director Alfonso Cuaron's *Love in the Time of Hysteria*. Lubezki then photographed the Showtime series *Fallen Angels* (winner of a 1993 Cable ACE Award for the episode "Murder Obliquely," also directed by Cuaron), and the features *Reality Bites*, *A Walk in the Clouds* (another collaboration with Alphonso Arau) and the recent Mike Nichols release *The Birdcage*. He is currently shooting *Great Expectations* with Cuaron.

"When I read the script for *A Little Princess*, I was fascinated. I fell in love with the story," reveals Lubezki. "I knew it was the movie I had always wanted to do. It had so many layers, and I knew it would be a challenge to translate [those layers] into images. I felt that the right approach for the photography was to be almost invisible — not to show off, but at the same time to enhance the reality and make it magical."

To create *A Little Princess*' enchanted air, Cuaron, Lubezki, production designer Bo Welch (*Batman Returns*) and costume designer Judianna Makovsky devised a unique way to enhance the film's visual narrative: virtually everything was one color, green. "Basically every prop, every set, every street and every piece of wardrobe was green," recalls the cinematographer. "But I don't think it takes you out of the movie. On the contrary, it helps you into the story and is so consistent that within the first minute, you're into that reality. The idea was to bring the viewer into a magical reality. So if green is reality for this girl, then we could say, 'Okay, how are we going to create fantasy? We need another color or texture.' The fantasy scenes also use green, but they also have yellow and orange! Now you are saying something with the colors. If you have yellow, orange, green, blue and red all the time, it's very hard to make a point with them."

Lubezki shot *A Little Princess* with Panavision Platinum cameras and Primo lenses without any filtration. "I shot the whole movie on 5293," he submits. "Before each movie, I do a lot of tests. The producers don't love that, but I do them very closely with the director so that there are no surprises. You establish a look from the tests and then you try to be consistent for the whole movie. For example, on *A Little Princess* we did some flashing. I flashed most of the interiors because on the tests we didn't like the way the blacks looked with no diffusion; it was too contrasty. But by flashing the negative 10 percent, the blacks looked less jet-black, but not milky."

Lubezki utilized large, soft sources to envelop the dark, moody sets with a wash of smooth illumination. "Our main approach was to use big sources like 20Ks and Maxi-brutes through 12' x 12' or 20' x 20' diffusion scrims. I also asked Bo Welch to paint the sets a little darker because sometimes the light was spilling onto the walls — the darker green absorbed the light so much that you couldn't see it. I like Maxi- and Mini-brutes a lot because you can use them as very big sources, or create a smaller source by turning lights on and off,

or beam them so they look like a standard tungsten lamp." Relying on the overall lighting from the large sources motivated by windows, Lubezki would then use Chinese lanterns for fill, sometimes suspending them from a boom to follow performers.

"Every project is completely different," Lubezki suggests. "I don't have any set style. That depends on the director and the script. Before shooting any movie, I try to see a lot of films to find ideas that I can use to tell my own stories. But the important thing to understand is that cinematography is not an end unto itself, and doesn't mean anything without the rest [of the production elements]. Photography is just a portion of the whole. The difficult part is to make everything blend together to create the film. That doesn't always happen, but sometimes all of the elements will click. In a strange way, everything on *A Little Princess* synched and worked together to tell the story. That's when cinematography becomes an art."

Photo by Richard Foreman.

Crimson Tide
Dariusz Wolski

The opening titles of *Crimson Tide* identify the three most powerful men in the world: the President of the United States, the President of the Russian Republic and the commander of a U.S. ballistic missile submarine. In the film that follows, the threat of nuclear holocaust and the weight of the almost unthinkable responsibility foisted upon the crew of the Trident-class *U.S.S. Alabama* creates high drama beneath the sea.

Directed by Tony Scott, the Simpson/Bruckheimer-produced thriller offered Polish-born cinematographer Dariusz Wolski a unique set of technical and artistic challenges, as well as the opportunity to explore some pertinent issues of the Nuclear Age. He offers, "No matter how much prep time you have, you're ultimately going to photograph the film in an unknown way. Tony has very strong ideas about the way he wants to shoot his films. But we didn't really find our style for this picture until we got on the set and began shooting within the confined spaces, working with actors and figuring out the logistics of moving a 40' x 40' gimbal. That's what makes it exciting. Every film poses its own problems, and you have to think and experiment to find the solutions.

"There's good photography and there's bad photography," he continues. "Tony's style is a bit flashy, of course, but we were trying to make the visuals exciting, so we took a bit of license. When you go on a real submarine, it's pretty damn boring. A real Trident sub has completely white ceilings and this terrible, flat fluorescent lighting. You might as well be shooting in a supermarket! So we took all the elements of reality and exaggerated them a little. For instance, the design of the ceiling was pretty accurate. It's very low, and there are hundreds of pipes, all sorts of vents and whatnot; we just painted our ceiling darker. We still used fluorescent lighting, but we made it much more moody and dramatic. Fluorescents played an important part in the film's lighting design."

With a substantial portion of the film set within the confines of the *U.S.S. Alabama* — under the command of Captain Ramsey (Gene Hackman) and newly-appointed Lieutenant Commander Hunter (Denzel Washington) — Wolski was faced with adding visual interest to what was "basically a theatrical play. The odd thing about this film is that scenes take place simultaneously in different parts of the submarine; we'd shoot in one set, such as the main control room, for four or five weeks, and then have to re-do all those scenes in the other rooms because the entire [communication between characters] happens over an intercom. So to make the rooms distinct, we gave each one a different look. The radio room had a blue-green look, while the weapons room was red."

Director Scott elaborates, "The color schemes came about because we had to keep jumping around between all of these different locations on the sub. During battle scenes, I'd cut from the main control room to a tight head shot of a guy down in missile control to a tight head shot of a guy in the radio room to a tight head shot of a guy in the sonar room. They were all very fast cuts. I wanted to create a visual shorthand so that the audience wouldn't necessarily have to remember each character and what his job was."

"Additionally, there were several different lighting looks," adds Wolski. "The main one was the torpedo-alert look, where the yellow blinking lights came on. Another was the look after the sub gets hit, when the lights went off and the emergency battle-lanterns with very strong beams turned on. All of this had to be carefully designed from scratch."

With the primary sub sets constructed on a 40' x 40' pitch-and-roll gimbal, Wolski and gaffer Claudio Miranda incorporated the lighting into the set's production design, and rigged the fixtures to accommodate any requirements entailed by the script's dynamic action. Says Wolski, "There were a lot of unusual problems in this film because a major part of it was shot on the gimbal, which turned 32 degrees in every possible direction. We built three sets on it: the main con room, the weapons room and the radio room. Everything had to be built into the sets; all of the lighting, every piece of equipment that went in there, had to be nailed down and absolutely secured so that we were able to turn the set in any way we wanted. And, of course, Tony wanted to turn the set as hard and as fast as possible."

Building lighting fixtures into the actual set allowed for a great degree of control during the shooting process. "Flexibility in the lighting was possible because we put everything on dimmers," Wolski explains. "The fixtures that we used are exactly what the Navy uses in submarines. Claudio took the Navy fixtures completely apart and put in our own high-output tubes and elements from Kino Flo. There was a grid inside that we got rid of because we wouldn't have been able to use our fluorescent tubes, so we just cut the center out. On top, he built individual ballasts so that they were all self-contained units. We had about 138 dimmer channels on a board in a room below, and all of our fluorescent lights were on two different circuits so that we could use one, two, or three bulbs depending on where we were looking. If you turned on too many, everything became too flat. So I used them in the frame or straight above someone's head to make a more dramatic look.

"Another problem was that if the high-output tubes are enclosed, they don't have any room to breathe and have a tendency to turn green. So we also had a built-in fan on every fixture to cool them. The fans were hooked to a channel on the dimmer board and to the soundman, so that when he hit the sound bell, the fans would shut off and we could record the dialogue without the fans running. Then when we cut, he would just hit the bell and the fans would come back on. Ed Maloney, my dimmer operator, spent eight weeks in the dimmer room with a video monitor so that he could see the playback. It got to the point that when we had to go back to scenes, he knew which lights had to go on and off for each line. He was as good as the script supervisor!"

Wolski shot *Crimson Tide* with Panavision cameras and E-series anamorphic lenses, almost entirely on Eastman's EXR 5298 500 ASA stock. "5298 is a great film stock. I don't see any grain in the film. I tend to overexpose and my printing lights are pretty high. That way, your contrast goes up, your blacks become darker and you eliminate any possibility of seeing grain. If you're very underexposed, then you start seeing grain. I was generally exposing between a T4 and a T4/5.6.

"You have to be careful with anamorphic lenses because of depth of field, especially when you shoot as tight as Tony does. You have to give actors and camera assistants room to work so the actors can move and the assistants can keep up. With anamorphic optics wide open, if you go to the edge

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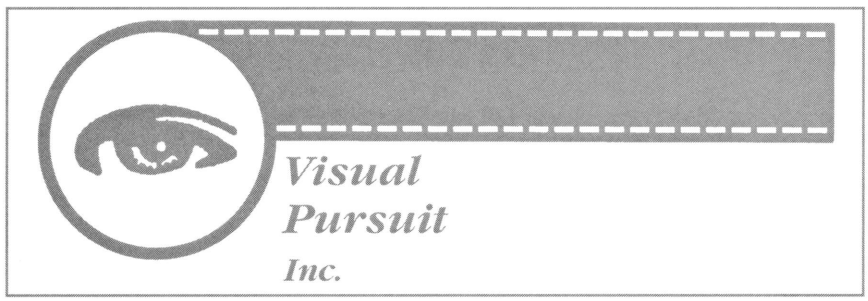

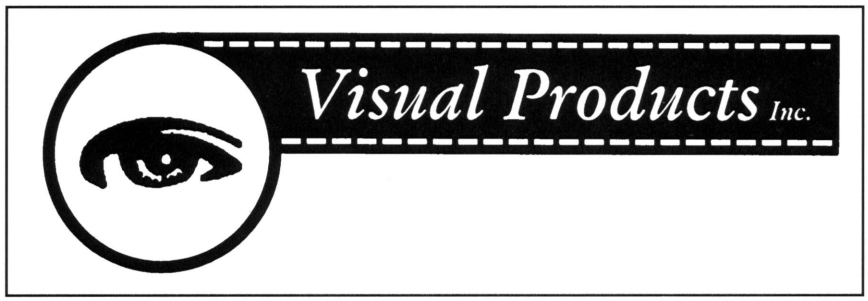

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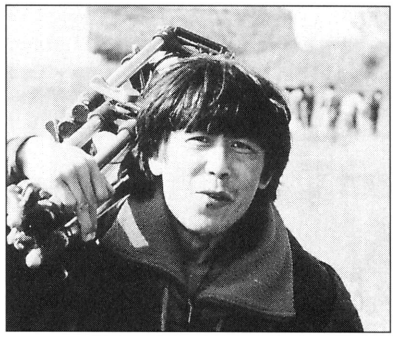
and put actors on the sides, the sharpness falls off."

Wolski's career began primarily with music videos and commercials before he moved on to photograph such features as *Romeo is Bleeding* and *The Crow*. He says that he has used each experience as a source of inspiration for the next project. "I had done a lot of bluescreen work on *The Crow*, and I used Kino Flo's incredible tubes for lighting bluescreens and greenscreens," he reminisces. "Every time I lit one I would say, 'This is so beautiful, we should light people with these!' As a result, the *U.S.S. Alabama*'s sonar room was lit with the green-spiked, high-output greenscreen tubes, representing the light coming off imaging monitors, while the room's ambient light was created by blue-spiked, high-output bluescreen tubes. That's why there's such incredible color separation. At one point we actually wanted to use a bigger source and tried to find a gel to match the blue tubes. Claudio went through many gels and combinations of gels trying get the same look, but the high-output blue tubes are designed to light bluescreens, so there's nothing more blue; there just isn't a gel to match it. Also, when you put a blue gel on a light, you lose tons of stop. And interestingly, the tubes always appeared much brighter on film, even though you didn't read much exposure-wise on the set.

"Basically, we kept all of the glow-light a stop and a half to two stops under. That's how we got such radiant color. It was very misleading. I would talk with Tony and he'd ask, 'Is this bright enough?' and I'd tell him, 'Don't worry! It's going to be.' Then we'd look at dailies and he'd be floored. I think light meters are set up for a white spectrum of light, so when you get into colors they get confused. If you try to light the colors brightly, it always turns out to be too washed out and doesn't have the saturation. I find that underexposing a color gives you much stronger saturation."

Wolski followed up his work on *Crimson Tide* by shooting *The Fan* for Tony Scott (due out this summer) and continuing his career in commercials. "I believe that cinematographers should contribute to the whole process of filmmaking," he asserts. "In this country, very often a cameraman is hired because he lights fast, knows how to light women and is basically a technical solver of problems. But I believe there's more to it. The more you understand the whole process of filmmaking, the more you realize it's not only about pretty pictures. If you are in touch with how the director thinks in terms of the whole film, you can take more chances because you know what he's going to use and what he isn't."



Shanghai Triad
Lu Yue

Cinematographer Lu Yue was born and raised in the Tianjin province of the People's Republic of China, and, like many of his generation, toiled as a farmworker in the suburbs of Peking during his youth. When the Beijing Film Academy reopened in 1978 (after more than a decade of dormancy enforced by the Cultural Revolution), Lu was a member of its incoming class. Though accepted into the cinematography department, Lu had limited photographic experience; his body of work consisted of some 36 pictures snapped on a borrowed camera. In fact, at the time, Lu could have counted the number of movies he'd seen on the fingers of one hand.

"My training as a filmmaker and my passion for motion pictures dates back to my student years," the cameraman says. Among his film school colleagues was Zhang Yimou, the future director of the acclaimed films *Red Sorghum*, *Ju Dou* and *Raise the Red Lantern*. The two formed a fast friendship, and worked together

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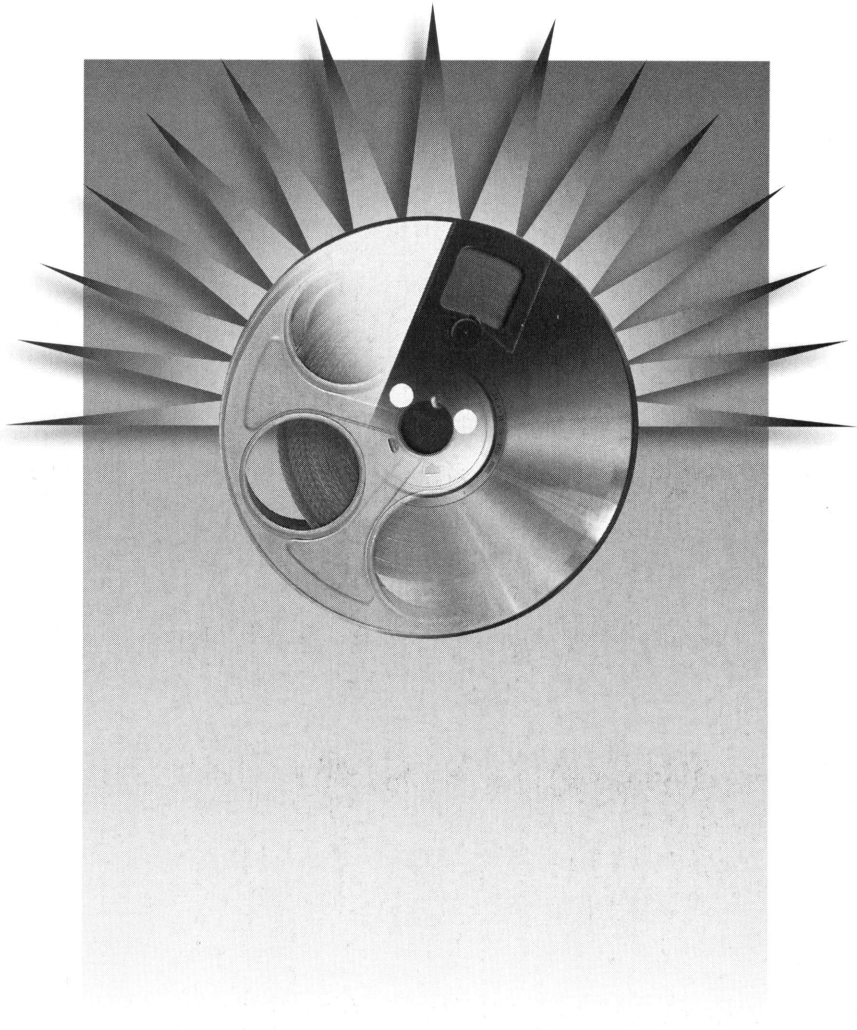

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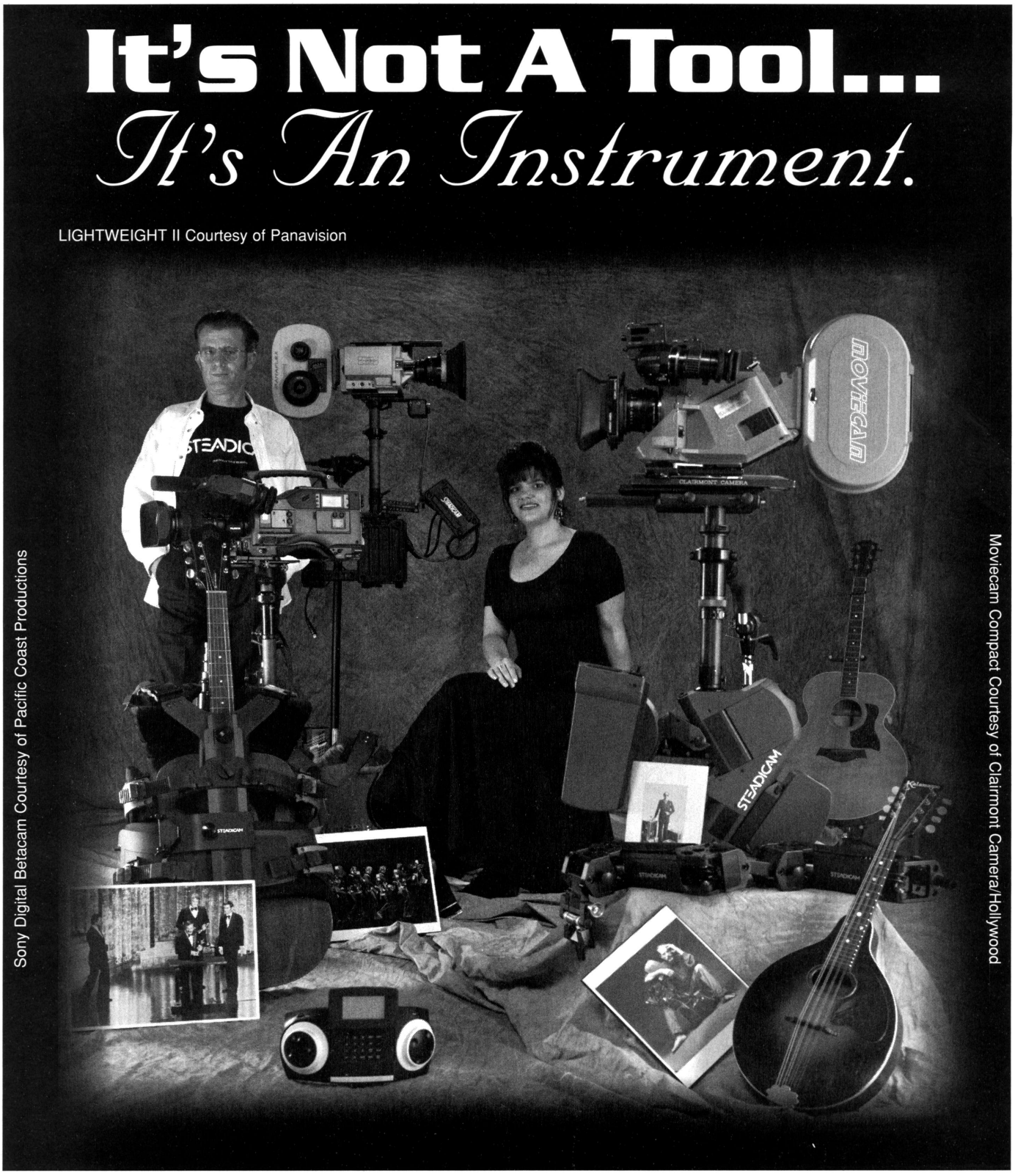
for the first time as camera assistants on the film *Red Elephant*.

Lu later moved to France for several years, where he photographed his first feature, *La Loi du Terrain de Chasse*. Returning to China in 1992, his subsequent work included *Pan Yuliang, Chinese Painter* and 1993's *To Live*, the first feature he would photograph for Zhang, his former classmate. *Shanghai Triad* continued this collaboration.

Prior to taking up the directorial reigns with 1987's *Red Sorghum*, Zhang too was a cinematographer; he shot Zhang Junzhao's *One and the Eight*, as well as the internationally acclaimed *Yellow Earth* and *The Big Parade* for Chen Kaige, director of *Farewell My Concubine*.

Zhang and Lu held extensive preparatory meetings to discuss an appropriate look for *Shanghai Triad*. "Before shooting," relates Lu, "we consulted a great deal of documentation on the Shanghai of the 1930s. There now exists numerous works on that period published in Hong Kong, England and Shanghai. But above all, I found inspiration in an album of old colored postcards of Shanghai published in Germany. In the original novel [upon which the film is based,] there were very few exterior scenes. That's why we concentrated mostly on the interiors and portraits. The art director, Cao Jiuping, made use of old show publicity posters to re-create the atmosphere of the era. In accordance with that documentation, I chose pastel tones and contrasty lighting."

Shanghai Triad evokes a conflict in the Shanghai Mafia between a godfather and his number-two man. The tale is told from the perspective of Tang Shuisheng, a 14-year-old boy whose uncle has brought him into the Green Dynasty Mafia run by the mysterious Mr. Tang. "The film is organized around Shuisheng's point of view, from his arrival at the port of Shanghai up to his departure from the island," says Lu. "We wanted to show the mystery, the secrecy and the unknown that the world of the Mafia offers to a youngster such as Shuisheng. He discovers it bit by bit, but can never compre-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hend it completely or clearly. It was also necessary to show the opulence and luxury of that world for a young peasant fresh from the sticks.

"The film's mysterious atmosphere [reflects] Shuisheng's bewilderment at the characters he discovers: the Mafia boss, Mr. Tang; his beautiful mistress, Xiao Jinbao [Gong Li]; and Tang's number-two man, Song. Obviously, for the sake of the narrative, we did not always adopt the subjective viewpoint of Shuisheng; we alternated with objective shots. But to express Shuisheng's point of view, we used either a Steadicam or a dolly camera. Transitions from objective shots to subjective shots were filmed as close-ups on Shuisheng."

Lu photographed *Shanghai Triad* with Arriflex 535 and 35-III cameras and utilized Eastman Kodak's EXR 5293 for day exteriors and interiors and 5298 for all nighttime scenes. The majority of the film was shot on specifically built sets, whether in the studio or on an island where the production designer constructed two houses.

"The Shanghai interiors were shot in the studio and in rearranged locations — hotel lobbies, private villas, and warehouses," specifies Lu. "Various lights were used according to the filming sites. For example, on the interiors, we were not authorized to make use of studio lights, so I used Dedo lights and a suitcase full of battery-operated fixtures. In the corridor scene, filmed at the Peace Hotel, we just replaced the 25-watt bulbs with 60-watt ones and used an 800-watt Mandarin [tungsten lamp] to light the background.

"I don't believe that the power of studio lights is very important. What counts more is the color of the light. I used many gels, including a series of 85 and 82 filters and half or quarter greens. We used tungsten lamps and HMIs together, one as the key light, the other as the fill light. I'm really inspired by the Impressionist painters, whose colors, illuminated by sunlight, are distinguished clearly from the colors remaining in the shade. So above all on this film, I sought to build my lighting as a function of the coloration I wanted

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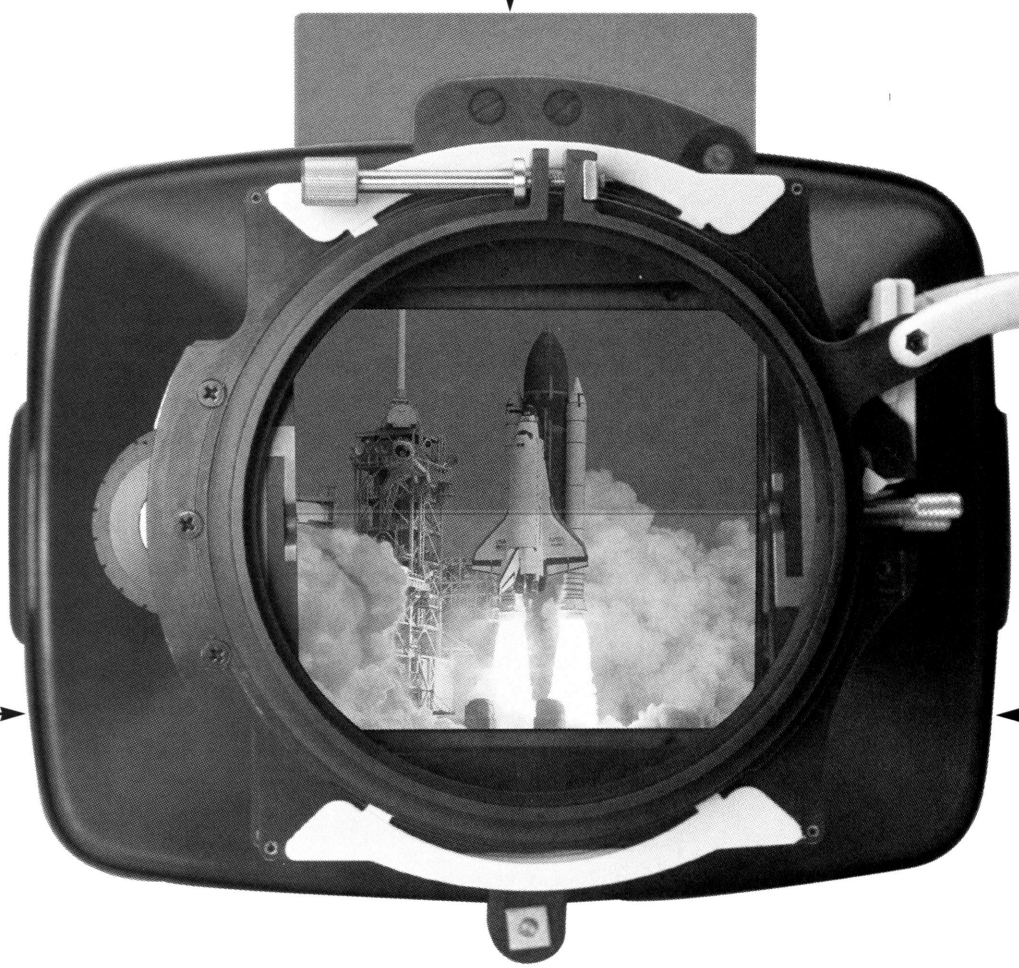

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to give the scene.

"On the exterior of the godfather's house, which we filmed on four locations, we shot at the onset of dusk and lit with four 5K and ten 2K Arri lights, along with twenty 800-watt Mandarins and a 4K HMI."

The story's conflict ensues when the enchanting Jinbao, also a cabaret singer, sides secretly with Tang's second-in-command, plotting to overthrow Tang from his rule over the opium and prostitution trade. Lu and the production team executed Jinbao's performance scenes, along with a ball sequence, in a nightclub set fabricated in a vacant youth recreation center.

"We chose the site because it had kept the original structure from the beginning of the century and was unoccupied," says Lu. "The room chosen for the scene of the show and the ball was huge, with high ceilings, which made it easy to arrange the lights. A week prior to filming, a crew of grips was sent to prepare the space. On the balustrade facing and behind the scenic, we put two 10Ks and ten 5K Arri spotlights. Along the side of the scenic, we installed ten 800-watt Mandarins, and on the scene itself, the set decorators placed 1,250 25-watt bulbs. Then in front of the scenic, a platform was constructed to hold a 5600°K 4K HMI lamp directed at Gong Li. All along the edge of the ballroom, we put a score of 60-watt neon lights in fake plastic columns."

Says Yu of Gong Li's character, "We wanted to show Jinbao as an adult and seductive woman, so as a singer, she appeared heavily made up. In the scene in her dressing room, for instance, we used floor lights to achieve an image approaching the look of Renoir's dancers, and on the island at end of the film, the use of natural light emphasizes the incongruity of her presence in that wild place. Finally, the night of the massacre, the swinging motion of the lanterns illuminates her tragic end; [at that point,] she's an animal caught in a trap."

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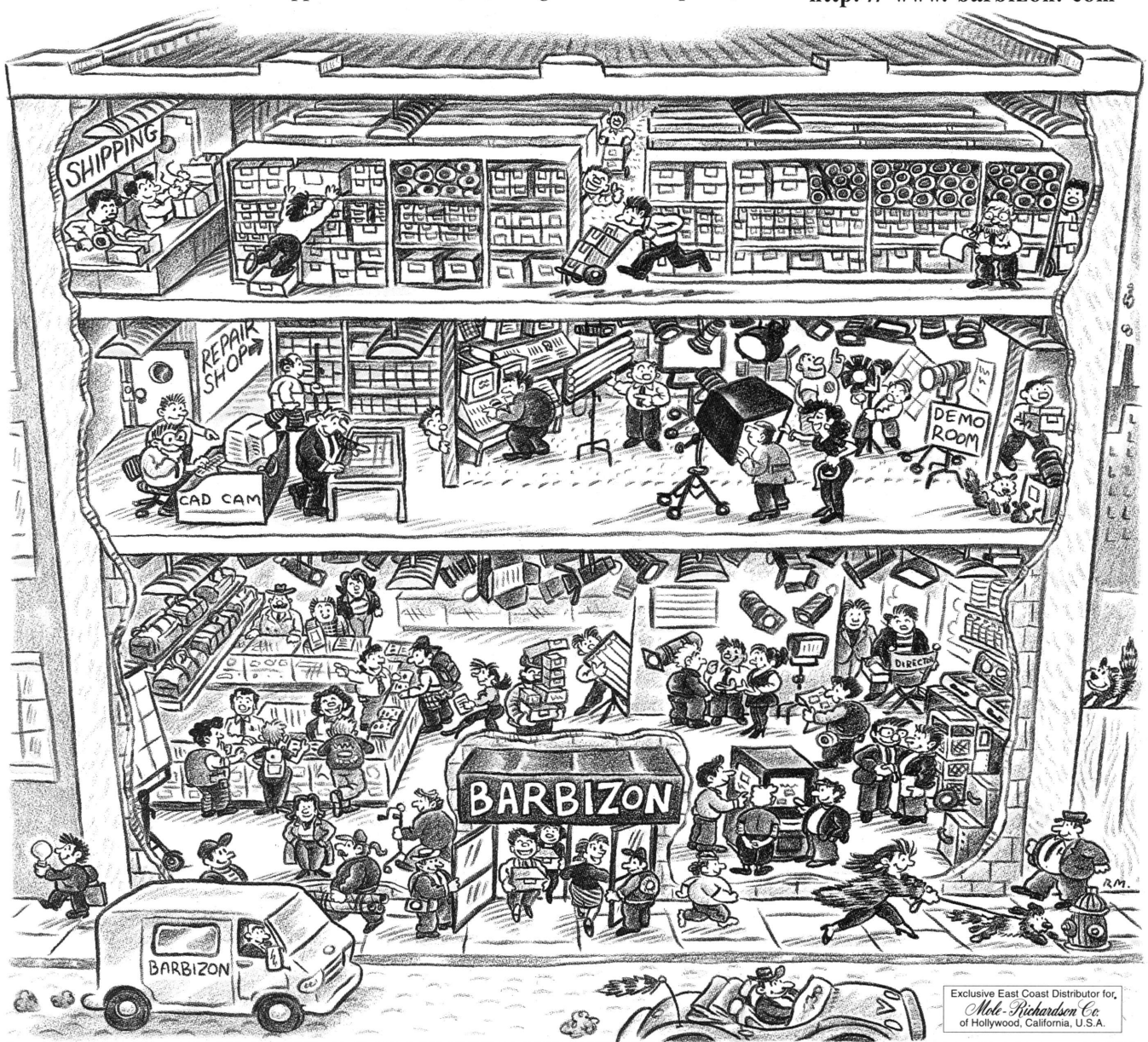

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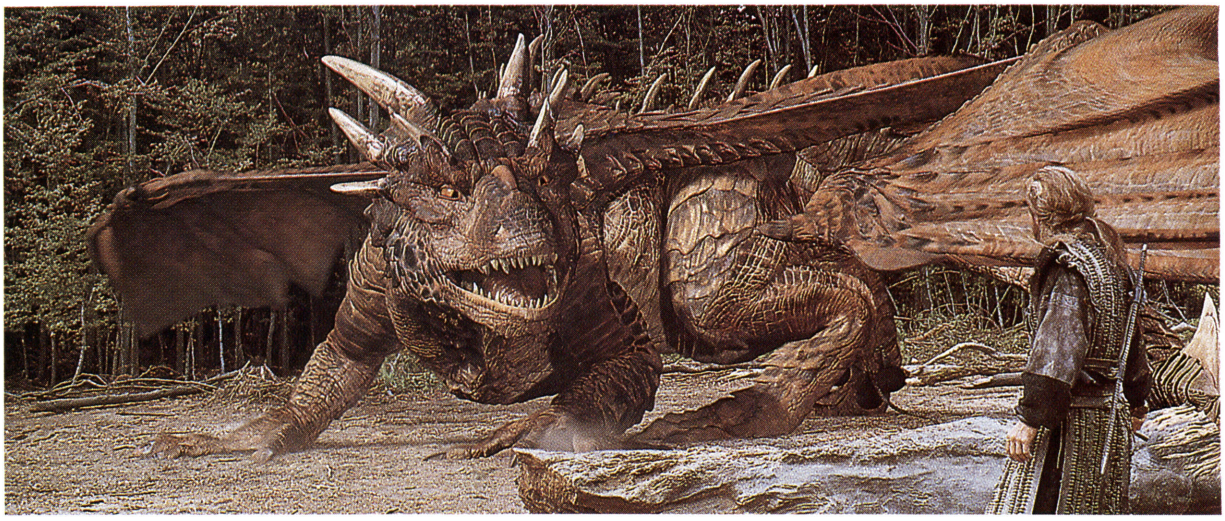


Draco (voiced by Sean Connery) confronts his hunter, Bowen (Dennis Quaid). Because the CG behemoth was expensive to produce, director Rob Cohen insisted that the VistaVision background plates be exposed for the deepest depth possible to ensure that the 42'-long dragon could be in sharp focus for its entire length.

Dragonheart Fulfills Filmic Quest

Director Rob Cohen, cinematographer David Eggby and ILM's Scott Squires stir up a medieval cauldron of special effects, scenery and spectacular photography.

by Ron Magid

DRAGONHEART IS DIRECTOR ROB Cohen's meditation on friendship and sacrifice in the changing world of medieval England at the end of the Arthurian era. The tale turns on the unlikely pairing of the last dragon, Draco(voiced by actor Sean Connery), with the last dragonslayer, Bowen (Dennis Quaid), who learns that the creatures he's hunted into virtual extinction actually possess a soul.

And so, 15 years after the Go-motion star of *Dragonslayer* first slithered across movie screens, and in the pixel wake of the computer-generated (CG) behemoths of *Jurassic Park*, a dragon once again reared its fearsome head to put ILM's effects wizards to their ultimate test. But before a frame could be animated, the arduous principal photography had to begin. Director Cohen, his cinematographer, Australian-born David Eggby, and visual effects supervisor Scott Squires used every bit of ingenuity to insure that a talking, 18-foot-tall dragon would blend convincingly with their background plates. The lynchpins in this triangle were the live-action and plate cinematographers. Eggby served in both capacities when he could, with Buzz Fietshines Jr. shooting background plates when Eggby was tied up with the first unit.

Ironically, Eggby, who has shot all three of Cohen's features (*Dragon: The Bruce Lee Story*, *Dragonheart* and the upcoming *Daylight*), wasn't even considered for their first teaming. *Dragon*, in part, was inspired by Cohen's tremendous respect for Asian culture based on years spent in the Far East — a sentiment not shared by *Dragon*'s initial cinematographer. This led to a swift and potentially destructive parting of the ways just prior to the commencement of principal photography in China. Miraculously, *Dragon*'s assistant director/associate producer, Herb Gaines, experienced a semi-mystical revelation while scanning his address book en route to Hong Kong: a card fell out which read "David Eggby — DOP."

"I called David in Australia and threw him one test question," Cohen recalls. "I wanted to shoot *Dragon* on Fuji because I felt that their stock was better-balanced for an Asian color palette than Kodak; however, in testing it, I found that while Fuji made Asian skin look wonderful, Caucasian skin looked a bit blue. 'Since this is a love story between an Asian man and a Caucasian woman,' I asked David, 'how would you make it balance out?' 'Have you tried shooting on Fuji negative and printing on Kodak stock?' he asked. 'I think if you shoot on Fuji, you can translate the colors to Kodak stock, which will always balance Caucasian skin warmer if that's what you want.' I said, 'C'mon over!' Thank God he was available! We've done three pictures together and we'll have a fourth and a fifth. I found my man and I just love him."

The director and his newfound cinematographer bonded quickly on *Dragon* because, in Cohen's parlance, "we'd both had an Act Two." Cohen's career

Photos by Ron Nellis and Industrial Light & Magic, courtesy of Universal Pictures.

suffered a major lull before he fought his way back by writing and directing *Dragon*. Similarly, Eggby's youthful pride nearly brought his promising career to a standstill after he had shot one of Australia's seminal contributions to world cinema: *Mad Max*. "Following its release in '79, I sat home and waited for the phone to ring for about three years. But you learn things as you go on," sighs Eggby, who now boasts some 18 films to his credit, including *Warlock*, *Fortress*, the two-hour pilot for the television series *Space: Above and Beyond*, and his three most recent projects with Cohen. Nowadays, his only fear is typecasting. "*Mad Max* certainly locked me into the action film area, whereas I'd love to do a romantic comedy with vestal virgins! I just don't get offered those types of films. Both *Dragonheart* and *Daylight* have a fair number of effects, so now I'll probably get offered all of these effects films. But I'm not complaining, because those kinds of films normally have big budgets and I'll get to play with all the toys!"

Assembling those toys was a hodge-podge affair on *Dragonheart*, which was already shaping up as the toughest shoot of Eggby's career because of the extensive interaction between its two stars — Bowen, the knight of the Old Code, and Draco, the massive CG dragon, which was not present in any of the original photography. Compounding Eggby's problems was the fact the film would shoot exclusively in remote Slovakia (a small country surrounded by Austria, the Czech Republic and Hungary), where equipment was a bit tough to come by. Eggby scored equipment in his native Australia, then acquired lighting and grip gear from Arriflex in Munich, while Panavision U.K. fulfilled most of his camera needs.

Eggby also got some small, albeit important, assistance from Panavision U.S.A. when Cohen informed the cinematographer that he wanted *Dragonheart* to be one of the first films with CG elements to be shot in an anamorphic format. But during the summer of 1994, when *Dragonheart* was gearing up for production, getting ILM's blessing to use that format was much easier than tracking down anamorphic equipment. "That particular year was the anamorphic year," Eggby says. "Luckily, I've got a few mates in Tarzana [the site of Panavision's Los Angeles offices] and I was able to acquire a set of lenses when I needed them."

The anamorphic process creates an epic, widescreen look by using a special lens to squeeze the image onto standard 35mm negative stock; when the film is projected, another lens unsqueezes the image into the Cinemascope 2.35:1 format, as opposed to the more standard 1.85:1 format obtained with ordinary spherical lenses. In essence, Cohen wanted to infuse *Dragonheart* with the breadth of the great Cinemascope adventures. He explains,"I wanted enormous depth of field, because, as I always pointed out to David, we were paying ILM for the whole dragon! Since we could somewhat adjust the depth of field in CG, sharpening or softening Draco's focus to create a greater reality between Dennis and the dragon, I urged David to produce the deepest-focus, richest and most highly resolved negative he could get."

Generally, Eggby prefers a slight underexposure to give a very full, rich negative, but his hands were tied when creating images that would be married to a CG dragon. "Rob told me, 'You can be as creative and as fancy as you want with all of the shots, except for the ones the dragon's in,'" Eggby recounts. "He said, 'The dragon plates have to be well-exposed and artistically lit, but we are planning for a dragon, so don't go underexposing by two stops.'"

But Eggby had to answer to the even higher authority of ILM. Though he had done some prior special effects cinematography (in the days of pre-digital effects, he was optical cameraman on *Predator*, shooting the alien's infrared POVs and filming the plates that blend the creature into its surroundings), he wasn't prepared for his intense working relationship with ILM's visual effects supervisor, Scott Squires. Eggby states, "Over the years, I've shot a bit of VistaVision and a fair amount of bluescreen, but nothing comparable to the amount on this film."

Just weeks before shooting commenced in July of 1994, Squires joined *Dragonheart*'s crew, replacing preproduction effects supervisor Steve Price, who had gone off to work on *Jumanji*. Until then, Squires had worked non-stop while supervising the groundbreaking visual effects of *The Mask*. All he wanted was a long vacation someplace, anyplace, far away from computer screens. But the affable Squires hadn't reckoned on the persistence of Rob Cohen, who insisted that Draco would not resemble the slimy lizard lurking in the shadows of *Dragonslayer*, but would instead be portrayed as proud and leonine with gold scales glistening in the bright sunlight. Squires picked up Cohen's gauntlet and signed on as *Dragonheart*' s visual effects supervisor. "It was going to be a lot of work getting the character to come to life," Squires sighs. "He was the costar, Dennis Quaid's buddy, and he played

Draco adds an incendiary touch to the evening's meal. Eggby found composing the respective 6' and 17' characters together in a 2.35:1 frame somewhat difficult, but "doing the first anamorphic CG film was a bit of a coup."

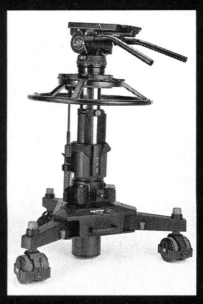
Live stage effects added to Draco's physical presence. Above: A bright source is cabled past a group of villager extras, creating the realistic glow of the dragon's fiery breath — the CG creature itself would be added into the frame later. Right: Star Dennis Quaid struggles to implant his steel into a mechanized Draco's soft palate — leading to a standoff between the characters.

throughout the entire film."

At this early stage, the toughest problem Squires faced was ensuring that he got as many near-perfect 35mm VistaVision background plates as possible. Thus, in mid-June, Squires accompanied Cohen, Eggby and all of the key department heads, including practical effects supervisor Kit West, on a three-week technical scout to picturesque Slovakia, which would double for 10th-century England. Bussing from location to location, Cohen and company referred to copies of the storyboards, bound like a small bible, while discussing the production's various challenges. From Squires' point of view, *Dragonheart*'s outdoor locations, mostly vast landscapes, coupled with the wildly kinetic background plates Cohen encouraged Eggby to shoot, would later present great difficulties when ILM attempted to lock the animated Draco into moving shots. When the rec company returned to the States, Squires spent what little preproduction time he had discussing different match-move strategies with ILM's resident expert on the subject, Charlie Clavadetscher.

Principal photography began in mid-July. For months, Squires shot his background plates alongside the live-action unit six days a week. Following Clavadetscher's recommendations, balls from sporting events functioned as match-move markers. "We used ping-pong balls for close-ups, tennis balls for medium shots, and these plastic 6" soccerball banks we found in Slovakia for the faraway shots. For static shots, we rolled a couple of seconds of film on our VistaVision cameras, then removed the balls. For moving plates, we left the balls in the shot as a guide for matching Draco into the background. While Eggby's crew set up the shot, I calculated the distance to Dennis' position and the place Rob wanted Draco in the real environment, then scaled that relationship to make sure we didn't crop Draco out of the shot. We used an electronic transit system, which bounced an infrared beam off a special prism set on top of each ball, to give us a digital readout of the proper distance. I wrote a program so the transit could send data directly to my PowerBook. The program also determined the pan and tilt of the camera as well as the slope distance, so back at ILM, our match-move people could apply that data to set the balls in 3-D space and use those points of reference to match Draco into the plate. We also shot a white 2' diameter sphere where the dragon would be as a lighting reference for our technical directors at ILM. Especially in complicated scenes with numerous light sources, the sphere became a guide they could use to get a rough idea of where the keylight was coming from, and also gauge the shading, the lighting ratio involved and the kind of coloration in the scene."

Cohen and Squires basically "nutted out" the look and performance of the dragon in each shot during an intensive series of preproduction meetings. Eggby rarely joined in, knowing that his concerns — the choice of lens, the angle of the sun or getting their Condor crane into certain locations — could only be addressed "on the day," when all final decisions are made. "As always," Eggby grins, "a lot of the problems were eradicated in preproduction. We looked at playback of Phil Tippett's animatics, as well as three-dimen-



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sional scale models and storyboards on location as Scott and I set up the shot. I've often said that if I could just shoot the movie like the storyboards, I'd end up winning more awards than I could count, but things change on location. After Scott and I picked where the tripod would go, and selected the lens and the lens height, Rob would come in and say yes or no, and then we'd rehearse the scene with our actors and it'd change again anyway! Scott had a tremendous impact on the plate shots, which was a third of the movie."

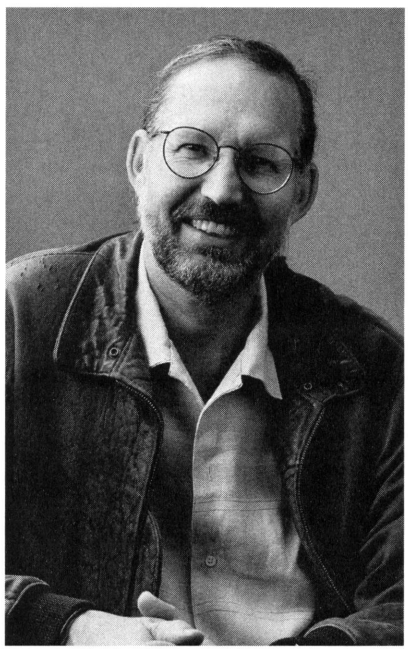
Eggby shot with a rich, if unusual, mixture of stocks: "Normally, people would shoot Kodak 5298, 5293 and 5248, the three T-grain negative tungsten stocks, but I chose 98 and 93, the high-speed tungsten, and 45, the slow-speed 50 ASA daylight. I used a hell of a lot of the 45 for our daylight exteriors. Once I learned its little idiosyncrasies, like never overexposing it, it was wonderful, sharp, crisp and vivid. I shot as much of the rest of the film as I could on 200 ASA 93 stock. I used the 500 ASA 98 for dim locations, and also for interiors and exteriors where the scene demanded low-light levels from candles, braziers, firelight and moonlight sources. Those stocks paid off, I think."

When he was shooting VistaVision background plates that would directly intercut with his Panavision anamorphic live-action photography, Eggby used the same stock in both cameras. "Ninety-nine percent of all the plates with Draco were shot on ILM's own VistaVision cameras," Eggby says. "I supervised the VistaVision cameras as much as I could; Buzz Fietshines Jr., who initially started out as my operator, became the second-unit cinematographer and shot some of the VistaVision exteriors. It was 50-50; when I was off shooting main unit, Buzz shot plates for Scott. Even though we discussed each plate shot beforehand, and used the same stock, there was always a difference when we mixed cameras and equipment. The biggest frustration I felt was with the lenses on our VistaVision cameras. Traditional Panavision or Zeiss 35mm movie lenses won't suffice for a VistaVision camera, because they can't cover the much larger eight-perforation negative area at the back of the lens and give you a true overall image. So we have to use much bigger Hasselblad or 65mm lenses, which are almost impossible when we're shooting at low light levels; the lenses are so slow, they cancel out our fast film. So I ended up using Nikon lenses made for still cameras! I was using all of these wonderful Primo anamorphics on the Panavision cameras, but then this quarter-million-dollar VistaVision camera, powered by a $50,000 motor, had this little Nikon 50mm lens that cost 300 bucks! I'm not complaining about the results, which were very good; after we reduced that large VistaVision negative to 35mm anamorphic, the images were as clear as anything. The production did buy some high-speed Nikon lenses, which were good, but it wasn't the same as shooting with a $35,000 T2 Primo lens with all the optics up front. There's got to be a difference; it's like a Pinto compared to a Porsche."

To give cast and crew a quick forced-perspective preview of the eventual composition, Squires posed an armatured Draco puppet, provided by Phil Tippett, in front of the camera. Naturally, Squires rolled a couple of seconds on VistaVision as a guide for his animators. "That way, I could remember how we set the shot up once I got back to ILM," Squires says, "and in the meantime, everybody could understand where the dragon was supposed to be in the shot."

This was especially helpful to Dennis Quaid, who often played against a recording of Connery's disembodied voice (or a skillful re-creation of the same by Cohen), interacting with the empty space where his costar would eventually appear. "We used 'monster sticks' on location, tall pieces of wood with round wood eye-pieces and marks indicating the height of Draco's mouth and shoulders, which gave Dennis and the other actors something to look at for eyelines and performance," Squires says. "I also had ILM's Creature Shop build a giant hand and a swinging tail, while the pro-

"I started out working for four years at what was then the best rental facility in Hollywood," says Director/Cameraman John Le Blanc, "Followed by thirteen years as a First AC. I have a trained eye for corner cutting at rental houses."



"When I began cleaning tripods there in the late Sixties, Mark Armistead was the standard of the industry for camera equipment," says John Le Blanc.

"Their reputation got me my first camera crew job in 1973; the DP knew I had been trained at Armistead. Because of that, he even hired me as a First AC. I spent thirteen years assisting. I got to work with (and learn from) DPs like Laszlo Kovacs and Vilmos Zsigmond."

"Four years at the World's most meticulous rental place had taught me what to look out for when I began prepping. I had no say as to where the cameras should be rented, of course, so I prepped everywhere. At first, no place was up to the Armistead standard; most didn't come close. But quite soon Panavision surpassed it in sophistication."

"However, having worked in one, I could never take anything for granted at *any* rental house. At every prep, my attitude was skeptical, to say the least. And I soon learned which places were cutting corners."

"After ten years of skepticism, I realised in the early Eighties that I'd started to take some things *almost* for granted when I prepped at Clairmont Camera. The old Armistead way had been to do things honestly and thoroughly. I began to recognise the same way of doing things at Clairmont."

"In 1986 I became a DP. Things at Clairmont were even better– more custom gear that was faster to work with, the same old impeccable maintenance. By 1990 (when I became a Director/Cameraman) Clairmont's equipment had become a seamless system. Since 1986, I've been able to pick the rental house on about 90% of my jobs," says Mr. Le Blanc. "That 90% has gone to the Clairmonts. I trust them completely."

John Le Blanc has shot 65mm 60 frames/sec. for Showscan and VistaVision 3D for Universal Studios. He won a Golden Lion at Cannes for his cinematography on a series of commercials for AT&T. He was 2nd Unit Director/Cameraman on the features *Cocoon*, *Prisoner Of Honor* and *The Outsider*. He is now directing commercials for November Films.

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duction built a full-sized mockup head, all of which we used as reference with people acting with Draco. But we rarely left any of those things in once we started animating back at ILM, including your basic over-the-horn type shots. When we cut the film together, we realized that Draco was moving around a lot, and that cutting to something that wasn't as dynamic looked dead, so we ended up putting our CG Draco head over the top of that."

In the logistical nightmare world of effects filmmaking, where everything is strictly storyboarded, you wouldn't think there'd be much on-set improvisation. "It wasn't often that we'd go on the set and make it up as we went along," Eggby agrees. "Effects people are like engineers; they want every nut and bolt to be just so. But Scott Squires was a nice, unflappable guy, a genius in his own right, and I could present new challenges to him. He understood that I was a shooting cameraman on location in Slovakia, filming in 10th-century castles, which didn't have big archways designed to fit Condors or massive trucks. Scott knew we had a schedule to adhere to and tried to compromise with me. He didn't insist that I shoot the slow-speed stock for those castle plates; he let me shoot 98, and I gave him a good negative."

Squires urged Eggby to create as much interaction as possible between Draco and the environment in the initial photography; this would give the plates a more realistic look. An especially delicate maneuver was the demanding Tor sequence, set on a rainy night in the mountainous ruins of Camelot, where Bowen encounters the spirit of King Arthur and regains his faith after Draco flies him there. "When the dragon put his wing over Bowen in a gesture of camaraderie, protecting him from the rain, we had to figure a way to create interactive shadows and also keep the rain off Dennis Quaid," Eggby recalls. "We used canopies to simulate the effect of Draco's wings, which got wet, sagged and didn't work out too well. But if ILM can create a 42'-long fire-breathing dragon, they can do shadows!"

One of Eggby's toughest challenges came while the production was shooting at eastern Slovakia's Castle Spis, which doubled for the shattered Camelot. This was the first sequence he shot, involving one of the largest exterior lighting setups Eggby had ever seen, and employing the film's largest crew, many of whom had limited experience and didn't speak English. "We had four languages on that brand-new lighting crew, so we used translators all the time," Eggby says. "That was a hard week for my Texas gaffer, Bob Driscoll. The Tor was one of the most challenging lighting sequences I've ever done. Not only was Spis the largest castle in all of Europe, it was also unapproachable and impregnable, so we couldn't get Condors or Muscos or cherrypickers up there to light that huge area or to get above the rain heads. I think I had 14 towers built around the place, and we also built a cabled rock-and-roll grid so we could hang lights above the water. This was a very large vista at night, so I had to light very trickily and cleverly. I used a multitude of reflectors with lights inside to uplight the walls and pick up the texture. In addition, Rob wanted the castle to have a golden appearance, so we created this golden light in the background. Meanwhile, we had to light Bowen when he emerged into the moonlight and pouring rain and flashing lightning, which we created using some big Lightning Strikes units that I got out of London."

Eggby shot with a multitude of blimped and non-blimped VistaVision and Panavision cameras on the ground and a mini-Vistacam on a small crane, in conjunction with every lighting unit known to man, to illuminate the world's largest castle ruin at night. But Cohen wanted more. "I've met every challenge he's given me so far on three movies, but this was tough!" Eggby says. "When Dennis heard King Arthur's mystical voice, Rob wanted the moonlight to transform into this golden yellow light — practically. Since I was using HMIs for the moonlight effect, I couldn't just dim them down and bring up the golden light. So I had to double up all the lights: I

had HMIs and large tungsten lights with layers of yellow gelatin to create this golden amber look. Fortunately, Arriflex in Munich had these electronic shutters from the '86 Olympics, which I put on all the lamps. Then I used a computerized system to open the shutters on the tungsten lights together, while closing those on the HMIs at the same time."

One of the few full-scale props to make the final cut was Draco's enormous jaws, built prior to Squires' involvement for the "Mexican Standoff" sequence that climaxes Bowen and Draco's first fight. When Draco scoops Bowen up in his mouth, the knight thrusts his sword up against Draco's soft palate in self-defense, so that if the dragon attempts to chomp down on Bowen, he'll die as well. This stalemate lasts all day and all night. "The Creature Shop built a full-scale 6' mechanical mockup of the inside of Draco's mouth and teeth, including a big articulating tongue," Squires marvels. "ILM sent a team of four puppeteers over to Slovakia to operate all of that, and we shot Dennis Quaid inside. Once again, we put markers all around his jaw using the same electronic transit system, and we did the other things we'd typically do on a moving camera: take a reading at the start and end of the move so we'd have as much information as possible."

Eggby recalls the standoff as one of the shoot's trickiest sequences. "That was an exterior we shot on a very cold night in Slovakia, combining real footage of the actor, animatronics with camera moves and, later, CG. To show that time had passed, we did a shot using a VistaVision camera on a remote head on a crane that climbed past Draco's mouth during the day, then descended along the same trajectory at night. Scott, Rob and I discussed the speed of the camera's movement and the proper lens, the intensity of light, the focus of the shot, and all of the elements. Scott and I also worked out exactly where Draco's eyes would be since we weren't shooting the whole head, and we discussed the placement of the ping-pong balls on the sides of the mouth so that ILM could match-

move their animation into our moving plate. Ultimately, we had to time our camera move to the tongue and jaw movements and the drool to create the transition into night."

Eventually, ILM's animators would generate the rest of Draco, precisely timing the movements of his CG head and lips to the full-scale articulating tongue that lip-synched along with Connery's dialogue.

When principal photography wrapped at the end of November, 1994, Squires returned to ILM, where a skeleton crew finished constructing the CG Draco model and did some R&D. The unusual demands of the project prompted Universal to allot Cohen ample time to edit his film before ILM began working on the effects. Cohen delivered the finished live-action edit in early April of 1995, giving Squires and company exactly one year to generate 182 dragon shots and 30 non-dragon shots. While it was still a battle to beat the clock, everyone involved understood how each shot fit with the emotional tone of the film.

The task sometimes seemed overwhelming for Cohen, who claims that prior to *Dragonheart*, he never did an effect more complicated than a dissolve! But by working alongside Scott Squires, Cohen and Eggby learned to respect the computer rather than fear it. "I think the computer has had a greater effect on the cinematographer than anything else in the film industry," Eggby insists. "We shot scenes with the powerlines in, knowing they could be digitally removed later. From a cinematographer's point of view, the effects people deserved a certain say since they basically made me look good. Of course, Scott had a lot more influence on this shoot, dictating how to handle things like shadows and continuity — quite rightly, because he was going to be creating the end image. I could not have asked for two better guys to work with on a film than Rob and Scott."

Dust and Danger at *Fort Apache*

Early John Ford Western had plenty of action before and behind the cameras, and made landmark use of infrared film.

by George Turner

Fort Apache is a walloping good Western, a prime example of the sort of entertainment that kept the motion picture industry flourishing for decades. The film's unusual production values include a style of photography that is rarely seen or employed today, as well as some very flashy stunt riding.

Made in 1948, *Fort Apache* was the first of the celebrated "Cavalry Trilogy" productions by John Ford and Merian C. Cooper. One of the few pictures of its time to take a sympathetic view of the plight of the Apache in post-Civil War America, it remains a landmark of pictorial imagery, thanks to the efforts of veteran cinematographer Archie J. Stout, ASC (1887-1973). Much of the dazzling work on horseback was executed by the then-unknown Ben Johnson, a true cowboy and superb actor who died in Phoenix, AZ on April 9, 1996.

Ford and Cooper had become associated between the years 1934-35, when they made *The Lost Patrol* and *The Informer*. They later formed Argosy Productions to produce *Stagecoach* (1939), which is credited with revitalizing the Western film and boosting John Wayne to major stardom.

A little-known entity (because its initial pictures were released under the aegis of Walter Wanger), Argosy was put to rest while Cooper and Ford served with distinction in World War II. Commander Ford and Colonel Cooper returned laden with honors. While Ford made *They Were Expendable* for MGM and *My Darling Clementine* for Fox, Cooper made a co-production deal with RKO that put Argosy back in business. *The Fugitive* (1947), filmed in Mexico, was an artistically sound but financially disastrous start for the resurrected entity.

Argosy needed a sure-fire hit — a good Western, say. Aboard the Lurline on a family trip to Hawaii, Ford read a *Saturday Evening Post* yarn by James Warner Bellah, titled "War Party." Cooper received a telegram from Ford's daughter telling him to obtain movie rights. This became the basis for *Fort Apache.*

Argosy signed *New York Times* movie critic Frank S. Nugent to write the screenplay. Ford had Nugent read 50 books about the time and place of the story, then sent him to Arizona to study Apache culture. Afterward he told Nugent to write out a biographical background for each of the characters, forget everything he had read, and write the movie. Ford then travelled to Monument Valley to scout locations with his friend close from *Stagecoach*, Harry Goulding, proprietor of the reservation trading post. With a lot of stunt action in the offing, it was decided to shoot on the Arizona side because insurance was more costly in Utah.

The expensive cast consisted mostly of friends Ford had worked with before: Henry Fonda, John Wayne, Pedro Armendariz, John Agar, Ward Bond, Victor McLaglen, George O'Brien, Anna Lee, Grant Withers, Jack Pennick, and former child star Shirley Temple, now grown up and just married to Agar. The teaming of the newlyweds in the picture garnered a lot of advance publicity. The top pay — $10,000 a week each — went to Wayne, Fonda and Temple.

Late in July, Ford returned to the location with the script, a 70-day schedule and a $2.8 million budget, followed by cast and crew, many stuntmen,

Fort Apache's leading players: John Wayne, Shirley Temple, Henry Fonda and John Agar.

and 300 Navajo men, women and children.

In the picture, Fonda is cast daringly against type as Lt. Col. Owen Thursday, a self-important martinet who arrives at Fort Apache with his daughter Philadelphia (Temple). Furious because he has been assigned to the desert outpost, he is soon at odds with Captains York (Wayne) and Collingswood (O'Brien), and most of the men. He opposes Philadelphia's romance with young Lt. O'Rourke (Agar), son of Sgt. Major O'Rourke (Bond). Meanwhile, Meacham (Withers), a trader, cheats the Apaches out of their rations and supplies them with whiskey and guns. (Unlike the Bellah story, the film makes it clear that the Apaches are not the villains, but victims of government-sanctioned crooks.) Thursday sends York to arrange a truce with his Apache friends, but double-crosses him and leads his troops against them. He and most of his men are wiped out when they ride into a trap. Years later, Kirby, in command of the fort, is interviewed by journalists. For the good of the army he agrees with them that Thursday was a great leader and that a heroic mural in Washington of "Thursday's Last Stand" is "correct in every detail."

More impressive than the story itself is the depiction of life at Fort Apache, where the soldiers and their families make the best of a hard life far from civilization. The acting and the handling of action sequences are also well-executed.

Director of photography Stout (whose son, Jay, had been killed while serving in Ford's Naval Field Photographic Unit) had photographed 17 of John Wayne's "quickie" Westerns for Monogram and Republic between the years 1933-36. Despite $10,000 budgets and schedules of 3 ½ to six days, Stout lent these pictures a distinctive visual style. Later, given more money and time, he made Paramount's Zane Grey Westerns look like epics. He also photographed *The Angel and the Badman* (1947), the first picture made by Wayne's own production company, as well as several more Wayne productions, ending in 1954 with *The High and the Mighty*.

On *Fort Apache*, the already heavy budget didn't allow for the Technicolor that Ford and Cooper had desired. Always seeking ways to glorify the great outdoors, Stout hit upon an idea to give *Fort Apache* a different, mythic look suited to its theme. He approached Ford with the idea of filming the exteriors on black-and-white infrared film. The director agreed.

This film utilizes the fact that the colors that make up light are of differing wavelengths, and therefore separate in the spectrum from violet through blue, blue-green, green, yellow, orange, red and deep red. Waves too short to be visible are called ultraviolet ("beyond the violet") while the invisible long rays are infrared ("below the red").The shorter infrared rays, when photographed on specially prepared films and plates, yield images much different from those obtained on panchromatic film, because infrared radiation is reflected and absorbed differently. Foliage, grass, rocks and sand — as well as many objects that appear dark to the eye — reflect most of the radiation and so register as near-white. The film is sensitive to blue, and the sky, being the richest source of light, registers dark or even black.

A confrontation brews between Fonda and Wayne as George O'Brien tries to mediate. At right is Grant Withers, the villain of the show.

For almost a century, infrared film had been in limited use for medical and scientific research. Cinematographers realized that black-and-white infrared film, when used with certain orange and red filters to restrict sensitivity to infrared radiation, could yield marvelous day-for-night effects, but found it tricky and undependable. Exposure was difficult because the eye and conventional light meters respond only to visible light. There was little latitude, and focusing was guesswork because infrared rays do not focus on the same plane as visible radiation. Emulsion speed was very slow, yet good definition required small apertures. Emulsion stability from one batch to the next was non-existent. Players appeared pale and men's beards showed through the skin.

After a few attempts were made to use infrared in feature photography, it fell into virtual disuse. However, it worked effectively for Jerome Ash, ASC in the day-for-night exteriors of Universal's 1938 serial, *Flash Gordon's Trip to Mars*, creating an unworldly look that was emphasized by making the release prints on green-tinted stock. Later, many of the stocks limitations were reduced by the introduction of faster and more dependable emulsions, corrective makeup, and rules of thumb regarding focus. In 1946, James Wong Howe, ASC was able to enhance the eerie beauty of the great red cliffs at Gallup, NM for night effect exteriors in Warner Bros.' *Pursued*, though retakes became necessary when dark clothing sometimes photographed white.

On *Fort Apache*, however, more infrared film went through the cameras than on any previous picture. Stout used 10,000 feet during production, 2,800 feet of which remained in the final editing. Since there was considerable trial and error involved, he used a test box (a small portable darkroom) to assess field calculations rather than wait for rushes. He found that many of the old obstacles of working in infrared no longer applied.

Stout conferred with Eastman technicians,

Photo courtesy of Charles Takacs.

Pals for 35 years, cameraman Archie Stout and "Duke" Wayne share a laugh. Stout photographed dozens of Wayne movies and was the best man at one of his weddings.

who explained that while most of the infrared eccentricities had been solved in their newest version of the stock, no definite emulsion speed for daylight had been established. With field experience and experimentation, Stout soon made his own exposure table. When using the General Electric (reflected light) meter with a reading of 150 footcandles, he used the 24A filter at f6, 23A at f8 and 29F at f3.5. Using direct light readings off the Norwood Director meter with a reading of 250 footcandles, he used the 25A at f6, 23A at f8 and 29F at f3. An emulsion speed of 8 was indicated. In the August, 1948 issue of *American Cinematographer*, Stout noted, "This may vary greatly, however, depending on the color of background and the density desired, so actual tests under given conditions, coupled with past experience, should be your safest guide.

"Probably the reason more directors of photography have not used infrared film more often is the fact that much of the first infrared was marked by unstable balance," Stout reported. "For example, two rolls. . . shot at the same f-stop and under the same conditions — and within an hour — would have a very wide difference in density — so much so that they would be practically unusable. Such hazards do not prevail with present-day infrared film. The density of the 10,000 feet used in *Fort Apache* remained quite constant throughout.

"[Infrared film] affords the progressive cinematographer many opportunities to achieve striking dramatic and pictorial effect shots that can be made in no other way," Stout added. "At the same time, it permits carrying on smooth continuity of photography by using the same film in medium and close-up shots. . . The vast expanse of blue, cloud-flecked sky, when emphasized by use of this film and filters, provides a dramatic backdrop for the story's teeming action.

"Normally, I found that the most advantageous light condition for shooting infrared is a cross or slightly front cross light, using a stop of f5.6 to f8 and a 25A filter. Of course, this is not a definite rule, but will give a working start that your test box can prove or disprove in ten minutes, and result in making corrections to suit one's needs. The dawn sequence, in which the troops are seen moving across the desert, was shot while a light rain was in progress, using a 29F filter and a stop of f3, indicating that the film is not restricted to use only in brilliant sunshine." The wet highlights on the horses and riders enhanced the beauty of this scene.

"Chalking out" of the actors was eliminated by the use of a light brown skin makeup and a darker brown lip rouge. This blended perfectly with the panchromatic shots, in which no makeup was used. The shades of brown were varied according to the filter used, most often the 23A and 25A, with occasional use of the 29A. "In several instances I used a 23A filter and then shot the scene to follow using a 29F filter, and succeeded in maintaining a balanced density in both long shot and close-up," Stout said.

The cinematographer further advised, "In using only the red filters, it is well to remember that all reds in the scene are consequently highlighted in color with a corresponding degree according to the filter used. All props normally containing red, such as flags, insignia, etc., should be replaced with duplicates in which the red colors have been replaced by light or medium brown, and the filters for the shot [should be] carefully selected. In balancing connecting shots, the sky should also come in for careful evaluation in the selection of filter to be used for long and close shots. A ground haze can cause serious trouble if shot in a backbite or back cross light. Where haze prevails, a few test shots developed on the spot will indicate the best filter to use, and at the same time convince you of the value of infrared film for getting dramatic pictorial effects that would not be possible with any other emulsion."

The distant mesas of Monument Valley are rendered in striking clarity in *Fort Apache* because the film "sees" through atmospheric haze. In some nocturnal and early morning scenes, however, ground haze creates unusual dramatic effects. Details in the closer rock and shale formations, which in life exhibit a wide range of colors, are sharper than in normal photography, and the shadows of clouds moving across the undulating land and towering rock formations create picturesque contrasts.

The most memorable images of all are in the last-stand battle, in which the Captain and the pitiful remnants of his detachment are overwhelmed in a narrow defile by hordes of mounted Apaches wielding guns and spears. The details are obscured and revealed in glimpses through a hellish maelstrom of swirling dust and smoke.

Second-unit and additional photography was contributed by William Clothier, ASC, who had just returned from working in Mexico. Clothier later gained fame for his photography of such large-scale Westerns as *The Alamo* and *Cheyenne Autumn.*

Although Stout wrote that "considerable credit is due director John Ford, for without his understanding, cooperation and assistance the dramatic pictorial shots that mark the picture would not have been possible," he admitted privately that working for Ford was no piece of cake. In fact, they fought through much of the production, and Stout even refused to photograph some scenes in the way that Ford demanded.

Ford thrived on dissension, however. By

Most of the male principals are trapped by the Apaches amidst the stunning Monument Valley landscape that Ford so often employed in his pictures. In left foreground is Fred Graham; standing at left, O'Brien and Pedro Armendariz; center group consists of Fonda, Dick Foran, Wayne, Jack Pennick, Ward Bond, Victor McLaglen and Francis Ford.

browbeating some of the players, he got the performances he wanted. He was brutal to newcomer Agar, insulted Fonda until he was in tears, picked continually at Ward Bond because the actor wanted to be a leading man, and fired Wayne's pal, Paul Fix, for coaching Wayne from the sidelines. He kept the "wives" standing in the sun until Anna Lee fainted. He needled Wayne until he was by turns pleasant and nasty. He had a fistfight with his hard-boiled older brother and second assistant director, Eddie O'Fearna. He particularly enjoyed badgering his much older brother, Francis Ford, who had treated John the same way when Francis had been a major director and star and John his assistant.

Ford also encouraged enmity between players in order to capture their tension in the film. On the other hand, he did patch up his 15-year feud with O'Brien, star of some early Ford triumphs, and gave him an important role. Wayne and O'Fearna also clashed often. Ford, Wayne, McLaglen, Foran, Withers and others tried to outrank one another. The marriage of John and Shirley Agar was already in trouble. All in all, it was the perfect atmosphere for making a John Ford epic.

The film's second-unit director was veteran stunt rider Cliff Lyons. Action sequences were shot separately and cut in later. One of the faceless stunt riders was Ben Johnson, a 29-year-old cowboy from Oklahoma whose main duty was to double Fonda in the action scenes. He had come to California in 1939 as horse wrangler for Howard Hughes' *The Outlaw*, and remained as a riding double for Gary Cooper, John Wayne and others.

Johnson was on horseback during a scene in which an ammunition wagon with four men aboard was fleeing to high ground. While taking a hard left turn, the wagon tipped over and the runaway team dragged it toward a rock face. Johnson raced past Ford and reined in the lead horses. There was a pileup of horses, but the men were saved from almost certain death. So impressed was Ford that he secured Johnson a seven-year acting contract at $5,000 per week, launching a distinguished career.

On August 11 the company returned, exhausted and bedraggled, to the coast. Two days later they resumed production at RKO Pathé, the rental lot in Culver City where the companies of Selznick, Sol Lesser and Edward Small also were situated. All of the fort interiors were made there. Then two weeks of parade ground exteriors were filmed at Ray Corrigan's movie ranch near Chatsworth, including a comedy sequence in which McLaglen has stuntmen playing raw recruits trying to ride horses with disastrous results. Production wrapped on October 2, 1947.

The RKO executives had reason to be happy with Argosy Pictures. Principal photography on *Fort Apache* had finished in 45 days (25 days under schedule) for a cost of $2.1 million ($700,000 under budget).

Postproduction included the synchronization of a symphonic score by Dr. Richard Hageman, arranged by Dr. Lucien Calliet. A concert pianist at six, Hageman had been a protégé of the Queen of the Netherlands, conductor of the Royal Opera of Amsterdam, principal conductor of the Metropolitan

Opera for 18 years, head of the opera department of Curtis Institute, musical director of the Chicago Civic Opera and conductor for six seasons at the Hollywood Bowl. He began scoring films in 1938 and won an Oscar for *Stagecoach* the following year. Calliet was an *Officier d'Academie of France,* arranger for the Philadelphia Orchestra and conductor of the Ballet Russe de Monte Carlo. The score for *Fort Apache* was built partly on old cavalry songs and Irish folk tunes, with soaring music for the riding scenes and appropriately menacing material for the confrontations and battles. The music adds majesty to the visuals. Vocal music is also used effectively for the troopers and especially in a fine solo performance by Dick Foran.

The picture opened in March of 1948. It was a big audience favorite, and its success cinched the financing of the bigger and better *She Wore a Yellow Ribbon* (1949), which depicts the cavalry in Monument Valley in Technicolor. The third in what is now called Ford's Cavalry Trilogy, *Rio Grande* (1950), is in black-and-white. All three films re-teamed many of the same players, including Wayne and McLaglen, with Johnson featured strongly in the latter two as the mysterious and heroic fugitive, Sergeant Tyree.

"Mr. Ford wasn't a Westerner, but he knew how to make a good Western," Johnson said years later. "Most of those fellers don't know whether a horse roosts in holes or in trees."

Credits

An RKO Radio *release. An* Argosy *production, presented by* John Ford *and* Merian C. Cooper; *directed by* John Ford; *screenplay by* Frank S. Nugent; *based on the story, "Massacre" by* James Warner Bellah; *director of photography,* Archie J. Stout, ASC; *additional photography,* William Clothier, ASC; *art director,* James Basevi; *set decorations,* Joseph Kish; *music by* Richard Hageman; *orchestrations by* Lucien Calliet; *film editor,* Jack Murray; *second unit director,* Cliff Lyons; *special effects,* Dave Koehler; assistant director, Lowell Farrell; *second assistant director,* Eddie O'Fearna; *sound technicians,* Frank Webster, Joseph Kane; *production manager,* Bernard McEveety; *makeup,* Emil La Vigne; *dance director,* Kenny Williams; *operative cameraman,* Eddie Fitzgerald; *grip,* Carl Gibson; *research,* D.R.O. Hatswell, Katherine Clifton; *technical advisors,* Major Philip Keiffer, Katherine Spaatz; *still man,* Al St. Hilaire. RCA *recording; Running time 127 minutes. Released March 9, 1948.*

Captain Kirby York, John Wayne; *Lt. Colonel Owen Thursday,* Henry Fonda; *Philadelphia Thursday,* Shirley Temple; *Sergeant Beaufort,* Pedro Armendariz; *Lieutenant Michael O'Rourke,* John Agar; *Sergeant Major O'Rourke,* Ward Bond; *Mrs. Mary O'Rourke,* Irene Rich; *Captain Sam Collingwood,* George O'Brien; *Mrs. Collingwood,* Anna Lee; *Sergeant Mulcahy,* Victor McLaglen; *Sergeant Quincannon,* Dick Foran; *Dr. Wilkens;* Guy Kibbee; *Silas Meacham,* Grant Withers; *Sergeant Shattuck,* Jack Pennick; *Cochise,* Miguel Inclan; *Mrs. Gates,* Mae Marsh; *Guadalupe,* Movita Castenada; *Shotgun guard,* Francis Ford; *Newspaperman,* Frank Ferguson; *Officer at Large,* Mickey Simpson; *Recruit,* Ray Hyke; *Ma,* Mary Gordon; *Hick recruit,* Hank Worden; *Reporters,* Archie Twitchell, William Forrest; *Stagecoach driver,* Cliff Clark; *Troopers,* Harry Tenbrook, Dan Borzage; *Cavalrymen/Stuntmen,* Fred Graham, Major Philip Keiffer, Cliff Lyons, Gil Perkins, Junior Hudkins, Hubie Kerns; *Bugler/Stuntman,* Frank McGrath; *Stunt double for Fonda,* Ben Johnson.

The foregoing article is based on interviews and conversations with Merian C. Cooper, Ben Johnson, Anna Lee and John Wayne, and Archie Stout's article "Dramatic Pictorialism with Infrared Film," which appeared in the August, 1948 issue of *American Cinematographer.*

Attack of the Vinegar Syndrome

An in-depth examination of the insidious virus that is eating away at America's cinematic heritage.

by Les Paul Robley

UNBEKNOWNST TO MANY, OUR American film heritage is deteriorating with each passing year at an alarming rate. Film archivists have estimated that a whopping 75% of all U.S. silent films have been lost through deterioration or improper storage procedures, and that 50% of all films made prior to 1950 are gone. In addition, many much more recent works lie in vaults, wasting away to the point where the negatives have become corrupted.

If steps are not taken to reverse this trend, some of the cinema's seminal works may be lost forever. The purpose of this article is to offer an in-depth explanation of the degradation process, in the hopes that detailed information on the seriousness of the problem will encourage studios and filmmakers alike to take measures to preserve and protect our collective film history — and future works — from further harm.

When cellulose triacetate base safety film was introduced in 1948 to replace the highly flammable nitrate stock, everyone thought it would outlast its deteriorating predecessor by leaps and bounds. Collectors of IB (Imbibation) Technicolor three-strip dye-transfer prints believed that they had invested in something that would outlive them in terms of non-fading color and image excellence. Unfortunately, this not the case as both cellulose nitrate and acetate have a built-in inclination to degrade. Some nitrate films have even lasted longer than safety film prints.

The first reports of triacetate degradation were discovered by the Eastman Kodak Company in the Fifties. Film from the government of India had been stored in a hot, humid environment which adversely affected the chemical stability of the plastic film support. Subsequent laboratory experiments by Kodak in high-temperature incubation ovens confirmed that improper storage of safety prints would yield cellulose contamination.

The dilemma was outlined by Anthony Slide in his book *Nitrate Won't Wait: Film Preservation in the United States*. He writes: "For a number of years, archivists have been noticing the pungent order of acetic acid emanating from some safety films, evidence of the film stock's deterioration. Because of the smell, the phenomenon has come to be known as 'the vinegar syndrome'. . . In 1991, [Kodak] revealed that safety film deterioration 'derives from the same chemical mechanism (hydrolysis) and the same triggering factors in the environment (heat and humidity) that nitrate decomposition does.' Without the hoopla and publicity surrounding nitrate film decomposition, it transpires that safety film has also been decomposing with the same finality."

Kodak disclosed to the press that "'vinegar syndrome' is a common term used to describe the chemical reaction occurring during the natural deterioration of triacetate film base in a sealed container." According to Kodak, when cellulose triacetate begins to degrade, acetate ions react with moisture to form acetic acid, producing the characteristic odor. In layman's terms, one 1000-foot (10-minute) roll of 35mm motion picture film can generate the equivalent of 250 teaspoonfuls of household vinegar! The acid attacks the film base and accelerates image color dye fading.

All freshly manufactured acetate film carries with it some level of acidity by the very nature of its composition. Hydrolysis is the reaction by which moisture in the film (water) cause it to decompose as the acetyl groups in the cellulose molecules become detached. Temperature and humidity both play important roles in regard to this liberation of free acetic acid. The room humidity controls how much water will be absorbed by the film, and the temperature affects not only color dye stability,

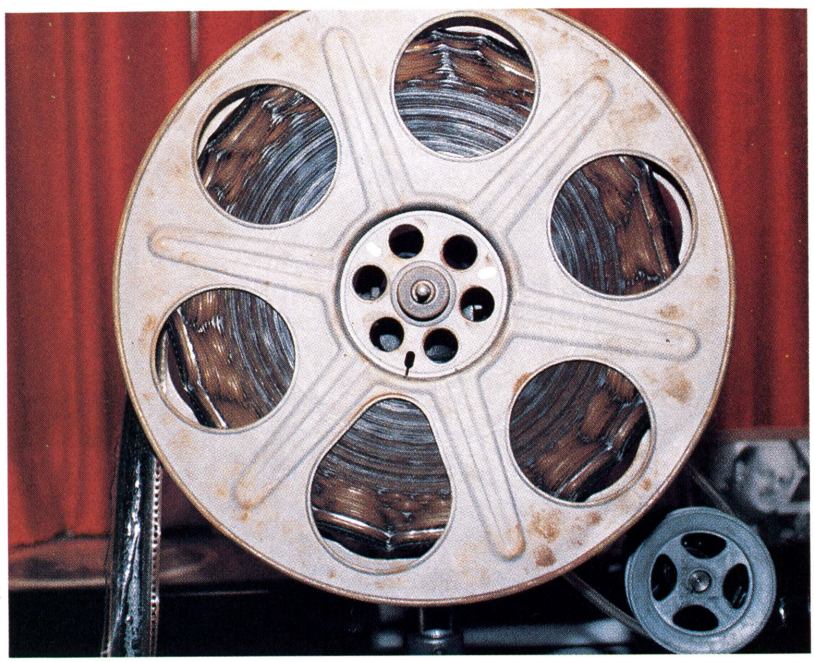


Photo by Les Paul Robley.

The dreaded aftermath of triacatate degradation: a ruined print weeping odious (and odorous) acetic acid. Isolating such a sorry victim from still-healthy prints is recommended.

but also the speed with which the chemical reaction takes place.

Excessive heat causes the shrinking and expanding of the base in conjunction with the less-affected emulsion layer, causing the latter to flake or crack. High humidity not only invites vinegar syndrome, but also promotes mold-growth on the gelatin emulsion. As the base shrinks, the emulsion gives way and the film becomes warped to the point where it cannot travel through a projector or printer. Seriously buckled film not only releases a sharp vinegar odor, but exudes plasticizers out of the plastic base. These resemble shiny slivers or crystals which have oozed out of the base onto the cel or emulsion surface of the film.

Prevention is the name of the game, and a film with only a slight "smell" can still offer years of use and entertainment.

Another, easily recognizable physical indication that alerts one to a badly decomposed print is when the film refuses to wind tight on a reel, or lies "unhappily" across your splicer. The effect when viewed from the side on a shipping reel is like a hexagonal "spoking" pattern whereby the film will not lie flat when wound in a certain emulsion-in-or-out orientation. By the time this happens, the film is unusable and is ready for the rubbish bin. So far, no one has discovered a way to reverse this process and bring the suffering print back to a salvageable level so it will run efficiently through a machine. But one can save a film that is in an early stage of vinegar syndrome and prevent it from getting any worse. Prevention is the name of the game, and a film with only a slight "smell" can still offer years of use and entertainment.

The vinegar problem was reviewed in 1990 by Kodak research scientists Dr. A. Tulsi Ram and N.S. Allen in various scientific papers claiming that the reaction was acid-catalyzed, meaning that once the degradation began, it fed on itself at ever-increasing rates. This led to the popular theory that an infected film can affect other healthy prints. When the acetic acid (vinegar) leaches out of the plastic film base, it either evaporates into the air, or it can be absorbed by the surrounding storage container. The effects of this process can be seen in the rusted enclosures of metal film cans encasing vinegar prints, or the embrittled paper surrounding them in shipping cases. The acidic fumes are very volatile and can be measured using A-D (acid-detecting) strips inside the fiber cases, polyethylene bags or cardboard microfilm boxes which formerly contained fairly degraded stock, long after the film itself had been removed. If the degraded film is contained in such isolation for a long period of time, the acid can become trapped. Being autocatalytic, this greatly accelerates the degradation process.

Similarly, "healthy" fresh film has been found in some cases to absorb acidity from deteriorating prints kept in close proximity. This, in turn, is thought to accelerate the rate of degradation in the fresh film. While there remains some argument as to the extent to which the absorption of acidic vapor motivates the degradation of fresh film, it is believed by most archivists that segregation of the diseased print is the safest policy in protecting a film collection.

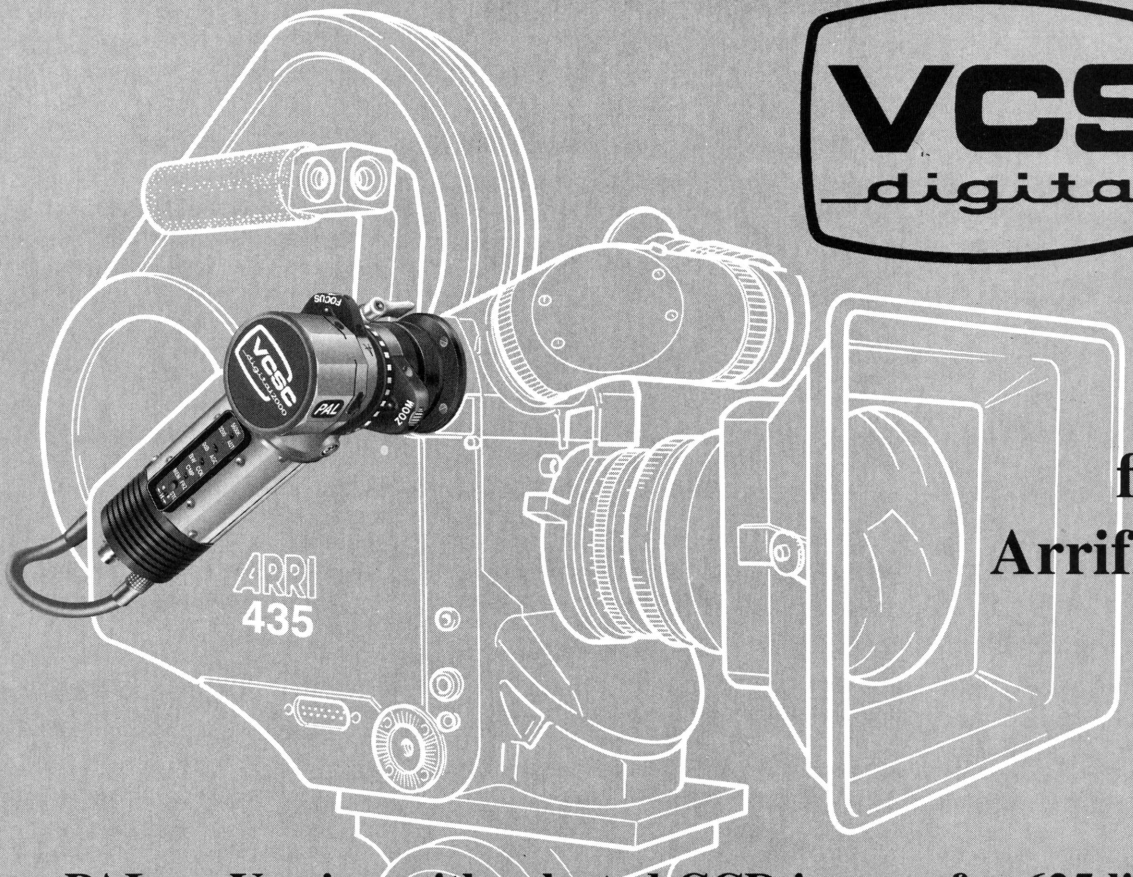
While it is not always possible (or pleasurable) to sniff every print in one's collection (the vinegar odor is strong and can lead to health problems, namely throat and skin irritations), one can assume that all collections of old safety film carry with them some degree of vinegar sickness; knowing which ones are at a higher acidic level than others can prevent the spread of the disease. Storing film in a well-ventilated area, as some archives do, can help lower the level of acetic acid in the storage area. The Image Permanence Institute of Rochester, New York (IPI) sells a Storage Wheel (along with their A-D Strips) which is based on the worst-case-scenario — the acid-trapping factor of film stored inside a tightly-closed container. The wheel details the effects of temperature and relative humidity (RH levels) on fresh acetate film, as well as film which has already degraded beyond a 0.5 free acidity level, the deadly autocatalytic point of film on the road to vinegar syndrome.

Based on results achieved with this system, IPI claims that new film stored at 50% RH in 70° Fahrenheit (normal comfortable room conditions) will take approximately 40 years to reach 0.5 acidity. The colder and dryer the environment, the longer the film will last. For example, film stored at 55°F, 40% RH may not suffer the onset of vinegar syndrome for 150 years. Films kept in very cold conditions (below 50° at moderate RH levels of 20 to 30%) can be expected to last for centuries. In fact, merely a 10° decrease in storage temperature may increase your film's existence by a factor of two. Even though water is a primary reactant with regards to vinegar syndrome, storing films below 20% RH is not recommended, as the dry conditions can lead to brittleness in the base of the stock. Without some moisture, the film might break apart when handled or run through a projector. Too much dryness also increases film curl and warpage.

There is a twist, however. Some film collectors who have stored film in their warm household closets have movies they know to be more than 40 years old, but which show no apparent signs of deterioration. Also, many film archivists know of films that are 40 years old but still in good condition. But it's important to remember that the IPI chart is simply a means of prediction, and that collectors do not always know how a film has been stored before they have appropriated the print. IPI assures us that the 40-year prediction is merely an approximation of the years to the onset of measurable deterioration, and not the number of years that the film will be able to last through a projector. The wheel acts as a guide with which to analyze, relatively speaking, how much better or worse one storage environment is in comparison to another.

Since nothing lasts forever, the converting of film information to a digital environment for long-term archival storage may not be such a bad idea. In the long run, opponents of videotape and

VCSC digital2000



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laserdiscs — mediums which have also shown problems in quality and durability, what with tape disintegration and disc sides unbonding — may be grateful for electronic storage mediums. Even if video afforded a suitably high resolution, the physical characteristics of the tape itself indicate that the image will deteriorate quicker than a film image. Thus far, black-and-white color separations have provided the best means of preserving original color negatives, but problems with registration of the three elements come into play if the three films shrink by different amounts during storage.

Even prints manufactured just 12 years ago have begun showing some loss of cyan density in the black area of the transparent image.

Of course, new technology may not always be the panacea that it first appears to be. For example, low-fade LPP color stock was once ushered in to greatly improve the cyan limiting dye-factor in earlier 5383 or 5381 Eastman color print films. The improved cyan dye was expected to last up to 50 times longer than that of a conventional magenta-stable Eastman print. But even prints manufactured just 12 years ago have begun showing some loss of cyan density in the black area of the transparent image. In a properly timed print with good contrast, the black area should be composed of equal densities of the three dye layers. The extent to which the cyan layer has a lower density than the more stable magenta layer in a faded print represents the amount of fading which has occurred in each layer over the years.

With regards to dye stability, nothing seems to have outlasted the old Technicolor Imbibation process of three-strip dye-transfer printing. The popular story among film collectors is that Technicolor labs phased out IB. printing in Hollywood because the trend in print orders gravitated towards smaller numbers of release prints, making the complex Imbibation process less economically feasible. *Star Wars* was probably the last big feature made in IB by England's Technicolor Labs, a company which used the process a few years longer than America before selling it to the Chinese in the late Seventies. China embraced the process because it made their Communist country less dependent upon foreign suppliers of color film stocks. The Chinese were able to manufacture the raw stocks required for Imbibation printing, but the resultant dye-transfer release prints suffered in image quality due to poor lab conditions, prompting the discontinuation of the process in 1994. At any rate, the very nature of the IB process made it less likely to achieve the degree of sharpness that is possible with the integral tri-pack films used in modern processing techniques.

Despite the superiority of dye stability in IB Tech prints, Jim Harwood, vault supervisor of the Kodak's PRO-TEK film preservation facility in Hollywood, points out that these films have been found to be more prone to vinegar syndrome than those using standard Eastman color processing, mainly because higher amounts of certain acids are used in the final wash. In addition, IB prints made with the Fifties' four-track stereo process, such as *Oklahoma!*, pose a double threat. In these older 35mm mag prints, the magnetic stripe used for the additional sound channels acts as a catalyst in accelerating the vinegar syndrome. The iron oxide (like rust) speeds up the chemical reaction, causing these acetyl groups to split apart even more, releasing the acetic acid and subsequent vinegar odor. Keeping the film in a confined place, such as a lab can or shipping case, accelerates the process further, to the point where the reaction begins to feed on itself, exhibiting the autocatalytic behavior described earlier.

Collectors often wonder why Technicolor does not revive the older IB process, making it less susceptible to vinegar onset using today's technology — particularly in view of its superior dye stability. But as mentioned earlier, there was a time when the dye-transfer process was no longer considered to be commercially viable. The older printing machines were very labor-intensive, and it sometimes required eight men to operate one printer. For the technique to work in the present, the printers would have to be completely redesigned to be competitive with today's faster printing process, and would demand the expertise of individuals who retired from the film industry long ago. Also, single print orders by low-budget producers would make the process less advantageous due to the amount of work involved in setting up one printer. For the process to become feasible again, only big pictures commanding large print orders would have the clout necessary to dictate a renaissance in the IB process. Still, there may yet be hope for IB's future. There has been talk of it being revived for use in selected roadshow runs of newly restored classics.

All this being said, what can low-budget producers or film collectors do to make sure that the items in which they have invested last at least through their lifetimes? For now, the best advice for collectors of old IB Tech product, which may or may not carry the dreaded "smell," is maintaining a proper, climate-controlled storage environment. Temperature plays a key role in slowing down the chemical reactions within the film. If cold storage proves economically impractical, a constant 70° temperature is still better than one which fluctuates continually.

"The absolute worst thing for long-term film storage is a fluctuating environment," reiterates Jim Harwood. "I have been in facilities where the temperature has varied wildly by 20 degrees on a daily basis."

For this reason, outdoor tin storage sheds, uninsulated garages, attics and public storage facilities are definite no-no's when it comes to preserving a valuable film collection. Even though a 70° office environment isn't great for color storage, it does less harm than one which fluctuates continually. As mentioned before, temperature equilibrium for film changes quickly (sometimes in a matter of hours), causing the film base to shrink or expand. The slight tem-

perature changes found in an ordinary household should not result in any physical damage to the film. However, the conditions maintained in some PRO-TEK vaults can be as low as a constant 34°F, 25% RH. According to IPI's acid wheel, this will effectively slow the doubling of acidity in a print which already has a 0.5 acidity level for roughly 500 years.

It's also best to avoid treating or rejuvenating prints with a scratch-removal process. Treated prints seem more prone to vinegar syndrome than untreated ones. Since IB prints are a valuable commodity on the collector's market, many have been treated with a substance using the same index of refraction as the film to "fill-in" the scratches and thereby maintain a scratch-free appearance. (Base scratches on a positive release print normally refract the light, which makes them look black on the screen. Some emulsion scratches fill with dirt, and after ultrasonic cleaning and scratch-removal, turn white when projected.) One SR process used polished ground glass to effectively sand down the film base, after which it was treated with chemicals.

"Some film rejuvenation of IB Tech material, for example, can accelerate the autocatalytic process," warns Harwood. "Apparently, some of these [so-called] rejuvenation techniques chemically add something to the base that just doesn't mix. I had heard of one process with a bit of acetone in it. All of these various companies that do scratch-removal use different combinations of chemicals, which is one reason for thinking that certain types of treatments will cause [problems.] I don't know if anything scientific has been done on it, but I do know of collectors who have taken a reel of film in for scratch-removal, and then found, years later, that it's the one reel which has vinegar problems. From an archival standpoint, no one in the archival industry likes to treat original negative or preservation elements with any form of rejuvenation, because they don't know what the long-term effect will be."

How does one know if a film has been treated? The nose knows, and often the easiest way to find out is to sniff it and see if you can detect any odor. But what if the degradation process is underway, and it hasn't yet gone vinegar? Or the rejuvenation smell has long since vanished? It is often impossible to pinpoint an odor within a massive collection harboring many different solvent smells. Plus, one can become desensitized after breathing the odor for prolonged periods, or risk hazards to one's health.

One fanatical collector I met in Europe actually uses his dog to sniff for treated prints, much like customs agents in airports use canines to sniff for narcotics. Another in Holland swears that one can use a magnifying glass or microscope to look along the edge of the soundtrack and pinpoint whether there is a coating on top of the picture area, since the process is normally limited to the image area projected on screen. Many collectors complain that they have encountered the most problems with vinegar from prints made in the Fifties, an era in which the earliest examples of Kodak triacetate safety film were made commercially available. Being an old stock, perhaps it's showing all the signs of decomposition. (The obsolete diacetate stock is even older and has its own set of acidic problems.) It's also possible that these stocks were once treated at one of many questionable West Coast rejuvenation facilities.

The problem is hardly exclusive to the West Coast, however. Many Fifties-era prints, both color and black-and-white, have experienced vinegar syndrome, which occurs with all types of film stock — Kodak, DuPont, Fuji, and so on. The one certainty is that all improperly stored acetate films will eventually succumb. A SMPTE Journal of May 1992 concludes that "the chemical stability of different cellulose ester-base films is generally quite similar. There have been reported cases where films from a particular manufacturer, or which were made during a certain time period, have poorer stability. However, there is no evidence to suggest that diacetate, triacetate, or mixed esters have inherently different stabilities because of their chemical differences."

If treating a film can affect a print adversely, what about coating it with film cleaning solutions, such as Vitafilm or trichloroethane? "There have been no known cases that I have heard of involving the commercially available cleaning solutions containing trichlor, which we use here at PRO-TEK," says Harwood. "Trichlor is very volatile and it evaporates very quickly, so it doesn't soak into the base of the film. It's more of a surface cleaner. Vitafilm tended to get into the film base somewhat, but I've known collectors who have experienced no problems after treating their prints with it. The only problem I've heard relating to Vitafilm was that it sometimes caused the IB dyes to run."

Vitafilm is no longer available, and trichloroethane (also known as methyl chloroform), used for years in film labs, will also no longer be an option. Due to potential ozone depletion, the world's environmental science community recommended a cease in the manufacturing of this solvent after 1995. Some suppliers can still be found, but access to the solvent will soon dry up. Instead, the film community will have to look for other nontoxic solutions, or rely on the PTRs (particle transfer rollers) and web cleaners used in local cinemas to clean theatrical release prints.

One collector thought that encasing a vinegar print in 3M's Photogard process might stop it from emitting the acetic gas. (Photogard is an expensive process that coats a protective layer around the film to prevent it from being scratched.) But just the opposite occurred. "Labs would routinely put it on their dupe negatives and release prints," admits Harwood, "but, from an archival standpoint, it's not used if at all possible on unique masters or original negatives. It's almost like encasing the film, or laminating it, and what [this particular collector did] was to trap in the off-gassing that was occurring within the print. He was suffocating the film. But as to whether or not it causes vinegar syndrome, I don't think Kodak has done any tests on it."

Remember that vinegar syndrome is autocatalytic; safety film needs to breathe. It's meant to be run, not placed on a shelf like a book. This is why archives tend to spend their time rewinding prints from heads to tails and vice versa at least every six months. Kodak recommends that a reel of print film be maintained in an emulsion-in orientation (tails-up for most 35mm theatrical release prints) from the time it was originally processed. They claim that the projected image is greatly improved, as there is less focus drift or tendency toward flutter. But some disagree with this, believing it is best to ocassionally reverse the wind to allow the film to curl naturally.

Some archives prefer a large, well-ventilated space for storing film material. The rolls are kept on cores in cardboard containers which allow the film to breathe and any acetic vapor to escape into the air. Last July's SMPTE Journal on the "Stability of Cellulose Ester-Base Photographic Film" demonstrated that film will show greater stability if the acid is allowed to escape. When film was incubated while free-hanging in a 90°C, 50% RH oven, lower acidity values were obtained. This allowed easy evaporation of the acetic acid, thereby reducing the autocatalytic effect. When freely exposed to air for a week, film with an acidity level of 5.4 dropped to 1.7. This simple test illustrated that the higher air-to-film ratio afforded easier escape of the acid from the print, slowing degradation.

Others argue against the idea of open-air storage. The big problem with this method is that it leaves the film susceptible to external elements that might come along — water damage, chemical contamination by air pollutants such as ozone and nitrogen dioxide, smog, carbon monoxide, fire, etc. In companion tests, Kodak discovered that open-air storage of film can lead to attack by atmospheric contaminants that damage both the film base and the dyes that form the image. But the IPI Storage Guide for Acetate Film counters that "pollutants originating from storage enclosure materials have a very strong effect on silver and dye images, although they are not usually a significant factor in chemical deterioration of film bases." The guide points out that "real-life stor-

age may involve more opportunity for the acid to escape; if that is the case, it will take longer for vinegar syndrome to occur."

Since a real-life scenario for motion picture film usually involves a changing environment rather than a steady one, the Institute has evolved a "Time Out of Storage Table" detailing the effect of changing climatic conditions on acetate film. The table reveals that removing a print from a vault for 30 days for exhibition can decrease the time in years it will take for the print to reach 0.5 acidity. Although dyes fade when exposed to bright light, the brief amount of time when the film is projected inside a hot film gate — even when it is shown hundreds of times — is probably not a significant factor.

The guide recommends that film be stored inside containers that are "chemically inert" toward the components of film. It points out that much damage has been done by reactive, poor-quality papers, adhesives and cardboard. Tin shipping reels and rusted metal shippers should be avoided for the storing of film. The metal reels bend easily, thus scraping the film on feed or take-up, and the metallic bits can flake into the print, damaging the emulsion irreversibly. Rusted metal can also act as a catalyst in the furthering of vinegar syndrome. Allen and Edge, in their Photographic Science papers, observed that still film degrades faster in a tin-plated iron container than in an aluminum, polyethylene or glass receptacle. Plastic reels and cases don't share these problems, but the jury is still out on whether or not the material can react harmfully with the film. Certainly plastic burns very easily in a fire. FPC, the "sales arm" for Kodak, sells metal film cans which have been treated with an inert, non-reactive paint designed exclusively for the storage of contaminated film. They also sell — and use, in the PRO-TEK vaults — molecular sieves.

Explains Ken Knaus of FPC: "Molecular sieves were recently developed by Kodak scientists and represent a real breakthrough for film preservation. They are like small chemical sponges which minimize the ef-

fects of vinegar syndrome. The sieves, which are inserted into the film cans, absorb moisture and other contaminants released during the natural aging of the film. This new technology will significantly extend the life of films."

Molecular sieves belong to a class of compounds known as zeolites, some of which can selectively absorb water, acetic acid and methylene chloride. The sieves resemble silica gel packets shipped with cameras and electronic equipment. When placed in water, they absorb moisture and become very warm. Five to six packets are generally placed with every 2,000-foot roll of 35mm motion picture film, and each will last for several years, depending on storage conditions. For Kodak's research, a specified sieve compound in polypropylene packets was placed within sealed film storage cans and tested using accelerated aging techniques.

"We can significantly slow the degeneration of motion picture film by controlling temperature, moisture, acids and vapors from the atmosphere surrounding the film," adds Harry D. Heuer, manager of special markets for Kodak Motion Picture and Television Imaging. "The molecular sieve is the tool used in conjunction with current recommended storage practices to achieve that control."

Whether or not the sieves will actually help a print already infected with vinegar damage is too early to predict. But Kodak is quick to point out that sieve technology provides added protection and is not a replacement for industry-accepted archival storage recommendations.

But one thing upon which everyone seems to agree is that storing a harsh-smelling print inside a closed container alongside fresh film is like signing the new film's death certificate. The autocatalytic behavior will likely cause faster deterioration in the good film. Sandwich experiments conducted in the same SMPTE Journal indicated that "undegraded cellulose triacetate base film will absorb acetic acid from adjacent degraded film, and that physical contact is not necessary for absorption to occur." It's probably better to isolate the vinegar film in a cool, open-air environment where it can release the odor without causing harm to other prints, or discomfort to people. The technical paper went on to suggest that film vaults be designed to either absorb acetic acid, or allow its free release. Continual air monitoring to detect the presence of film-base decomposition by-products may be one way to achieve this. Unfortunately, IPI's A-D Strips do not function well as room monitors, because the acid-detectors change color over time by the absorption of carbon dioxide in the air, forming carbonic acid and giving a false reading of acidity. Even fresh film will turn the strips blue-green, since all acetate film has a measurable acidity level immediately upon manufacture.

Freezing the film is one way to seriously halt the phenomenon (as well as to stop dye fading). In an August 1985 SMPTE Journal, "Freeze/Thaw Cycling of Motion-Picture Films," the paper maintains that the act of thawing and re-freezing film does not harm it. However, there is still concern within the preservation community regarding the freezing of film, since frost buildup and condensation upon improper removal can lead to damage.

A former editor of *American Cinematographer*, Richard Patterson, detailed the recommended procedure for the storing of color film in the July and August 1981 issues of the magazine. He points out that sealing the film inside a moisture-proof polyethylene bag in a relatively dry environment eliminates the need for humidity control in a vault or storage facility. Concern over the possibility of chemical reaction taking place between the bag and the film is discussed, as well as the use of moisture-proof tape to seal film cans (which can likewise be purchased from FPC.)

There are also those who claim to have answers for the whole vinegar syndrome problem. One collector suggested the technique of running the infected film through a rag doused with one of the fast-evaporating commercial brand cleaners, then heating the film surface with a blow-dryer while slowly rewinding it. This, he believes, will evaporate the mois-

ture trapped in the base which causes it to offgas. The late Tom Ogburn had a method called Filmbrite which he claimed flattened a degraded print to the point where it might run through a machine. Another treated his film with a homemade concoction of camphor and citrus oil derivative that has allegedly put a halt to the smell and the degradation attributed to it for a couple of years. The citrus works as an anti-acidic, and airing out the print for three days did seem to get rid of the smell. But as to the trustworthiness of these techniques, time will ultimately tell whether they are just projections in the dark.

Perhaps when a film is in the early stages of vinegar syndrome, one of these methods might be useful. But when it reaches a state of 5.0 or 10 acidity level and is completely wrinkled, these techniques become questionable. Most archivists believe that nothing can reverse the syndrome. Once it has started, one can only slow it down by cold storage, low humidity and the various tools Kodak offers. These may merely be remedies, and the real cure may be some ways off.

Recalls Harwood, "During the early days of 16mm, when diacetate was introduced, many home-movie companies, such as Kodascope and Universal Show-At-Home, would place chunks of camphor in the can to help keep the film pliable and not let it dry out. There might be something in this. . ."

Thankfully, polyester-based mylar film is not affected by vinegar syndrome. Since it does not have an acetate base, it cannot leach acid out of its stock. Mylar is more chemically stable than acetate or nitrate and is said to last up to ten times longer than these films under the same storage conditions. Estimates of over 1,000 years of satisfactory life were gathered from incubation studies of one to two years' duration by the Image Permanence Institute. But polyester base has its own set of problems. The softer emulsion makes it more susceptible to scratches, and its tough base prevents easy tearing, making conventional splicing difficult and a potential hazard for ex-

pensive projector, printer or camera equipment.

"The best way to not have to go through expensive restorations is to store your negative in a cool, dry environment," concludes Harwood. "If the humidity is low enough, this method will retard vinegar syndrome as well. Our facility here offers climate-controlled vaults of 34 degrees Fahrenheit and 25 percent RH. Fifty features on 16mm will cost about $40 a month. Fifty on 35mm [averaging six reels per feature] will cost around $120 a month. This may seem a small price to pay 50 years from now, when it comes time to do color separations."

"Digital reconstruction of damaged motion picture films will be possible in the near future," says Bob Bender, strategic planning director for advanced technology products at Kodak. Tools on Kodak's Cineon digital film system provide capabilities for scanning film into a digital format for manipulation at an image computing workstation. The digital pictures can be recorded onto a high-resolution intermediate film without compromising the image quality of the original. The countless digital composites involved in visual effects applications, such as the plate backgrounds in *Under Siege II: Dark Territory*, *Heat* and Kodak's own Cineon demonstration at NAB, *Believing is Seeing*, have demonstrated many times over that this process really works.

Bender believes this technology can be applied to the restoration of valuable films. Once the film has been digitized, scratches and other artifacts can be repaired by an image computing workstation, in the same way that dust was lifted from cels during the restoration of Disney's *Snow White and the Seven Dwarfs* [see *AC* Sept. '93]. Also, missing image data could be "cloned" from an un-damaged frame to produce a seamless restoration, just as wire and rig removal is done in visual effects applications. The corrected digital pictures could then be recorded onto a high-resolution intermediate film, without a trace of vinegar syndrome.

Film Preservation: A Practical Guide

Key steps and suggestions on how best to protect valuable prints.

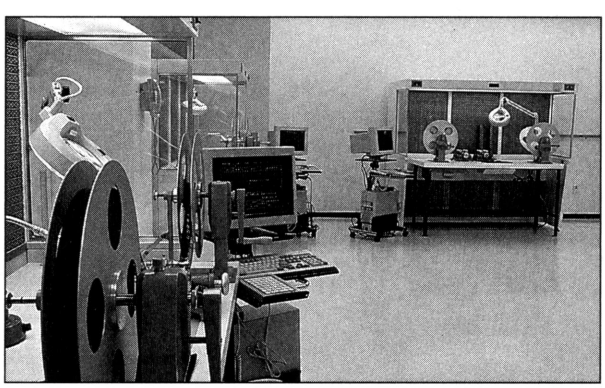
by Karen Kalish

A DISCUSSION ON FILM STORAGE IS not sexy, but neither is the deterioration of a film in which you've invested your heart and soul. Whether you're a cinematographer, director, lighting designer, editor or a specialist in any other area, a little piece of you goes into every film that you work on.

The intention of this article is to focus on storage — the preventive medicine for film preservation — and to provide a brief rundown of fundamental facts relevant to film storage; a few cost-effective, "financially-friendly" preservation strategies; and key sources of information.

"Cinematographers who concern themselves with creating their works on film should also be versed in what happens to that work as it is stored over time," says Fred Murphy, vice president of operations for the Paramount Television Group. "This way, they can knowledgeably discuss with those responsible for maintaining their negatives, the most advantageous storage financially available, even if only on a frugal budget."

Storing prints and negatives under closely-monitored archival conditions, such as those maintained at Kodak's PRO-TEK vaults and inspection rooms, is the best insurance for their future.



Photos courtesy of PRO-TEK.

"Not everyone has millions of dollars to build and operate a sophisticated preservation facility," Murphy concedes. "As a major studio, we have sound business reasons to invest that magnitude of money in our assets. An individual or small company shouldn't throw in the towel, however, thinking there's nothing they can do toward preservation on a small or non-existent budget. Asset protection can in fact be tailored to the nature or budget of the collection. Many people believe you must go 'whole hog' to preserve your material, or it isn't worth even trying. That's simply not true."

According to The Library of Congress/National Film Preservation Board's 1994 report, "Redefining Preservation: A National Plan," new research in film deterioration shows that small, incremental changes in storage conditions, such as decreases in temperature and humidity, can result in considerable life extension for film collections. Even degraded film will last longer under cooler and drier conditions.

In the years to come, film will be reproduced and distributed by a variety of new technologies, some now available (at high costs) and some yet unrealized. The key to future access is to preserve the original long enough to be converted, restored, and distributed in these new ways. Original films have the maximum image and sound quality and will be the best platform from which to create access copies in the future. It is important to emphasize that digital restoration techniques will soon be a part of, but not a substitute for, the preservation of original film materials.

Determining the Archival Quality of Your Negatives

A 15-minute test can determine if your black-and-white print films and sound negatives are of archival quality. If they are found not to be of archival quality, they can be made archival by rewashing.

Contact: Tom McCormick, N.T. Audio, 1833 Centinela Ave, Santa Monica, CA 90404, (310) 828-1098.

Detecting Vinegar Syndrome; Storage Guidelines

The Image Permanence Institute has developed A-D Strips, which can be used to objectively and accurately determine the presence of vinegar syndrome. Their *IPI Storage Guide for Acetate Film*, a four-part publication, includes a calculating wheel which relates film storage to how long film will last, and explains the relationship between temperature, relative humidity and vinegar syndrome. Together, the *Guide* and the A-D Strips make a kind of "do-it-yourself film preservation kit." One is a

diagnostic tool, the other explains what is going wrong with film and tells how to extend its life through better storage. The *IPI Storage Guide* costs $25.00 and includes detailed information on vinegar syndrome. The A-D Strips cost $29.95 per package; each package includes 250 detector strips and instructions for use.

Image Permanence Institute, 70 Lomb Memorial Drive, Rochester, NY 14623-5604, (716) 475-5199, fax: (716) 475-7230.

Fighting Vinegar Syndrome with Molecular Sieves

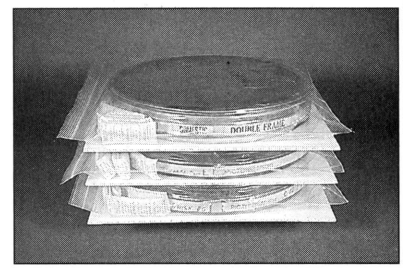
Molecular sieves act like chemical sponges, minimizing the effects of vinegar syndrome by lowering the moisture and absorbing the damaging acid contaminants. To help prevent the vinegar syndrome, films should be stored in clean, rust-free metal containers. (The reason the cans must be rust-free is because oxide, or rust, is a catalyst for the vinegar syndrome.) The sieves cost 25 cents each; depending on the size of your film cans, three to six are suggested.

To obtain additional information, or the actual sieves, contact FPC, 6677 Santa Monica Blvd., Hollywood, CA 90038, (800) 814-1333.

Soundtracks with Vinegar Syndrome

The following process for handling vinegar syndrome on soundtracks, as detailed by Universal's Sound Facility, begins when the tracks are removed from their cans or boxes and placed in a "stinkerator." This device is a large metal box with film racks inside; after it is sealed shut, fresh air is drawn in and across the contaminated film and evacuated to the outside. The film is then inspected routinely for moisture and decomposition content, and removed from this metal box when dry. A gentle Kimwipe cleaning, splice and perf inspection and repair follow. After re-labeling and re-boxing, the material is transferred to both analog and digital protection masters. The original infected units are saved, but isolated from all other uninfected track units.

Two facilities that are equipped to handle soundtracks with vinegar syndrome are: Chace Productions, 201 S. Victory Blvd. Burbank, CA 91502 (818-842-8346), and Film Technology, 726 Cole Avenue, Hollywood, CA 90038 (213-464-3456). For information on how to care for picture elements afflicted with vinegar syndrome, see listing of "Labs That Specialize in Preservation" later in this article.



Photos courtesy of CAL/MSC, MRC 534 Smithsonian Intstitution.

A combination of low-density polyethylene stretch wrap, silica gel packs and plastic bags can help ensure that canned film will survive long-term cold storage conditions.

Treating Shrunken Film

A specialized treatment can restore shrunken film to "on pitch" measurements, thereby allowing duplication of the film by means of a continuous printer or the transfer of the film to videotape. The cost for the treatment is 10 cents per foot for films that are 10-12 years old, and approximately 25 cents per foot for older films with vinegar syndrome.

Contact: Arnold Sheiman, Restoration House Film Group, 12 Village Drive, Belleville, Ontario, K8P 4J8 Canada, (613) 966-4076.

Storage Tips for Those with Severe Budgetary Restraints

While the Paramount Television Group is not inhibited by restrictive budgets when it comes to preservation practices, Phil Murphy is well aware that most film collectors may not have the fiscal resources to maintain state-of-the-art storage facilities. However, his empathy for preservationists with severe budgetary restraints has led him to offer the following suggestions and guidelines with regard to the proper care of optical materials.

"The worst condition of all is to leave a roll of film in an attic or a warehouse with no temperature or humidity control, [where it can be] affected by climate and weather of the environment," says Murphy. "Subjecting the material to such extreme changes in conditions over a long period of time is damaging. If the best conditions you have available are warm and humid, but at least consistent, you're better off than if the conditions change from good to bad to good in cycles. Offices may offer reasonably good conditions while they're occupied, but most buildings turn off air-conditioning on nights and weekends, which may result in large temperature fluctuations for the film. Stable poor conditions are better than wildly fluctuating conditions."

The next best thing, says Murphy, is to maintain the consistency at lower temperature and lower relative humidity. "If you're an independent producer with a small collection and a frugal budget, buy a used refrigerator with a frost-free freezer. Should you choose to go this route, there's information later in this article on how to contact the Smithsonian Institution for their simple method of packaging film for this low-cost method of preservation."

Considerable improvement can be made via some simple preventitive measures mentioned in the National Plan, namely:

- Lowering thermostats
- Shutting off heating vents
- Relocating collection materials within a structure

This plan also concurs with Murphy's suggestions that household freezers can be a very successful storage approach for some small collections. (They also provide protection from fire and flood.) Listed below are some guidelines for the use of refrigeration.

Cold-Storage Packaging for Conventional Freezers

The Smithsonian's Critical Moisture Indicator (CMI) packaging method for conventional freezers has only recently been developed in their lab, and the technology is being implemented in a number of cold-storage applications at The Smithsonian Institution. The simplest and least expensive embodiment of the CMI method utilizes the common metal film can, low-density polyethylene stretch wrap, the critical moisture indicator, and silica gel packs. The total packaging material minus the film can costs less than one dollar per 1000-foot roll of 35mm negative, and the package can be easily assembled in about one minute.

For details, contact Mark H. McCormick-Goodhart, CAL/MSC, MRC 534 Smithsonian Institution, Washington, D.C. 20560, (301) 238-3700 ext. 114, fax (301) 238-3709.

Freezers

In addition to low-cost household freezers, mini walk-in freezers are also available, with prices starting at $3,100.

Contact: Norlake Scientific, Second and Elm Streets, P.O. Box 248, Hudson, Wisconsin 54016, (800) 477-5253.

Please note that nitrate requires a flammable material storage freezer or an explosion-proof freezer. It's also important to note that the freezer method is still a little controversial within the preservation community, because if instructions are not properly followed, damage to the film can occur. Questions about this method can be answered by Rick Utley at PRO-TEK (213-468-4450), David Wexler at Hollywood Vaults (800-569-5336), or Mark McCormick-Goodhart at the Smithsonian (301-238-3700).

Other Storage Options

Depositing Films with Archives

Archives not only make films available for research, study, and appreciation, but also provide secure storage — often in low-temperature, low-humidity environments designed expressly to pro-

tect film. Many filmmakers, from D.W. Griffith to Andy Warhol, are known today largely though works that came into the safekeeping of these institutions. For active filmmakers, archives often make special arrangements to allow continued access to their material under conditions that ensure their preservation.

These details are described in a section of The National Plan titled "Depositing Films with Archives: Guide to the Legal Issues." Eric Schwartz, one of the individuals who drafted this document, can be reached at Proskauer Rose Getz & Mendelsohn, LLP, 1233 20th Street NW, Suite 800, Washington, DC 20036-2396, (202) 416-6817.

The Ideal Environments: Full-service or Self-service Vaulting

Both full-service and self-service vaulting options offer current protection techniques and technologies for optimum safekeeping and preservation. The difference between the two is that full-service vaults provide many services that include pickup and delivery, inspection, retrieval and shipping. Full-service vaults are only accessible during business hours and do not allow direct access to the vault stacks. Self-service vaults do provide clients with access to their individual unit within the vault 24 hours a day, seven days a week and offer direct control over the inventory system, stored material, plus complete confidentiality. By putting your negatives in a vault, you are ensuring the protection of the negative and don't need to buy insurance. If you do have insurance, often times you can get a cheaper rate by telling the insurance underwriter that the material is properly vaulted.

At the self-service Hollywood Vaults, the cost of a double vault is less than 25 cents per can per month. Contact: David Wexler, 742 N. Seward Street, Hollywood, CA 90037-3504, (800) 569-5336. At the full-service PRO-TEK Vaults, a 1000-foot can costs 35 to 37 cents per month. Contact Rick Utley, 1017 Las Palmas Avenue, Hollywood, CA 90028, (213) 468-4450.

Film Labs That Specialize in Preservation

When you are ready to take additional steps, the following facilities also offer help with preservation:

- Cinetech, 1900 West Burbank Blvd. Burbank, CA 91505, (818) 840-1130.
- Film Technology, 726 Cole Avenue, Hollywood, CA 90038, (213) 464-3456.
- John E. Allen, Inc., 116 North Ave., Park Ridge, NJ 07656, (201) 391-3299. (In Northeast PA, John E. Allen/Cinema Arts, 717-676-4145.)
- WRS Motion Picture Labs, 1000 Napor Blvd. Pittsburgh, PA 15205, (412) 937-7700.
- YCM, 2312 West Burbank Blvd. Burbank, CA 91506, (818) 843-5300.

Active Organizations and Foundations

Association of Moving-Image Archivists

The AMIA promotes moving-image archival activities, especially preservation, through meetings, workshops and direct assistance. Their newsletter lists their networking events, educational opportunities and information on the preservation of both film and tape. At the group's 1995 Toronto Conference, laboratories from across the United States and Canada participated in a forum where they shared their preservation experience.

Association of Moving Image Archivists c/o National Center for Film and Video Preservation, The American Film Institute, P.O. Box 27999, 2021 North Western Avenue, Los Angeles, CA 90027, (213) 856-7637.

Mary Pickford Foundation

Keith Lawrence, who is managing director of the Mary Pickford Foundation as well as an AMIA member, is currently helping the AMIA to establish and coordinate a scholarship fund for continuing education in preserva-

tion. Lawrence's goal is to help make libraries accessible to the public; he's very open to teaching individuals how to make money off the libraries they have. The foundation also gives colleges and universities monies for scholarships.

Mary Pickford Foundation, 9171 Wilshire Blvd. Suite 512, Beverly Hills, CA 90210, (310) 276-3523.

New York Women in Film & Television

New York Women in Film & Television founded the Women's Film Preservation Fund in 1994 in association with the Museum of Modern Art and American Movie Classics. This is the first step by women within the industry to raise funds for archival restoration. (The organization also has male members, two of which, director Robert Benton and actor Dustin Hoffman, are on the Honorary Board.) The mission of this fund is to preserve films on which women played a major creative role. The group's first preservation project was completed last spring, and was shown at the 1995 Hamptons International Film Festival. Last June, their first fundraising event generated enough money to allow for a second project.

New York Women in Film & Television, 274 Madison Avenue, Suite 1202, New York, NY 10016-0701, (212) 679-0870.

International Documentary Association

The IDA is devoted solely to promoting non-fiction film and video and supporting the efforts of documentarians. A preservation seminar was held at the 1995 International Documentary Congress; preservation discussions are also offered during the year. The IDA Documentary Center at the AMPAS Film Archive, the only center devoted exclusively to the collection, preservation and study of documentary film, was established jointly by the IDA and the Academy of Motion Picture Arts and Sciences.

IDA, 1551 S. Robertson, #201, Los Angeles, CA 90035, (310) 284-8422.

A Few Words on Videotape Preservation

William T. Murphy will soon be coordinating "A National Study of the State of Preservation of American Television and Video Materials" for The Motion Picture Broadcasting and Recorded Sound Division of the Library of Congress. The format will be similar to the study completed in 1993 for American film. Fact-finding hearings were held in March. Completion is expected by end of 1996. For more information contact Steve Leggett, project assistant, or William T. Murphy, project coordinator, (202) 707-5912.

For Videotape Information: VidiPax, a videotape restoration service bureau specializing in old, damaged and obsolete videotapes, provides a toll free help line, (800) 653-8434 (the group's web site, www. panix. com/~vidipax, offers articles on video restoration and preservation, and provides links to other preservation resources).

VidiPax, 920 Broadway, New York, NY 10010 (president: Jim Lindner). Vidipax's West Coast affiliate has a list of "Do's and Don'ts of Video Tape Care." Contact Jim Wheeler via e-mail: Jim Wheeler@aol.com.

Additional Published Information

"Redefining Film Preservation: A National Plan" includes information on film storage and depositing films with archives.

Film Preservation 1993 — Vol. 1 includes information on the Technicolor and Eastmancolor printing processes, film bases, and the fundamentals of preservation.)

Complimentary copies are available from: Steve Leggett, Motion Picture & Broadcasting Division Library of Congress, Washington, D.C., fax (202) 707-2371.

Publications from the Society of American Archivists

This organization is known for supplying publications that focus on archiving and preservation. Their Publications Catalogue lists over 100 titles. Society of American Archivists, 600 S. Federal, Suite 504, Chicago, Illinois 60605, (312) 922-0140.

National Film Preservation Board Information on the Internet

Gopher site address: gopher://marvel.loc.gov:70/00/research/reading.room/motion.picuture/nfpb.

World Wide Web homepage: http://lcweb.loc.gov/film.

Handling Nitrate

YCM Labs has put together a list of suggestions for handling nitrate that is sent to their clients. To obtain this list write: YCM Labs, 2312 W. Burbank Ave, Burbank CA 91506.

A Few Closing Words

To Cinematographers:

"Because restoration is done without consultation with the cameraman, it is all the more important to try to be faithful to what they were trying to do. I have been shocked by the poor timing (grading as we call it) in some recent work. And today's cameramen ought to pay attention to restoration — because their future reputation depends on it!"

— Kevin Brownlow (Film historian, restoration producer of Abel Gance's 1927 *Napoleon*).

"We must remember that it is not just old films we have to worry about, we should think about preservation right now, for our recent films. This is serious!"

—Film editor Thelma Schoonmaker, ACE *(Raging Bull, Goodfellas, Casino)*

"If you find out that one of the films you've worked on is being restored, try to be there for some indelible transfer, ask if you can be present — offer to participate, to watch the timing. I offer my time if it's in New York, and if my airfare was paid to go to L.A., I'd offer my time there. It's hard for other people to guess what the intent of the cinematographer was."

— Gordon Willis,ASC *(The Godfather, Annie Hall)*

Son of *Flipper*

Being prepared makes the difference while filming dolphins on and under the open ocean off sunny Honduras.

by Mary Hardesty

Watercraft, like cars, actually have a "hot" season of the year when most purchases are made, and that time is summertime. Along with the requisite picnics in the park and volleyball matches on the beach, comes a new wave of watercraft commercials.

For Sea-Doo watercraft's latest national spots (running 15 and 30 seconds), a rider comes to a halt in open water and raises his hands, only for a school of dolphins to leap from the water in unison. Executed entirely in-camera, the scene utilized a combination of live action plates of real dolphins choreographed jumping in pairs. These plates were integrated to appear as an entire school of dolphins. The final shot was a composite of the dolphin plates and the Sea-Doo rider.

The ambitious undertaking of this "Follow the Leader" commercial was placed in the capable hands of Pierre deLespinois, a director/cinematographer whose experience with state-of-the-art compositing techniques has graced recent spots for Sears and Chevy.

"Twelve mattes were used, and this was the first time we had tried anything quite like it. Just a few years ago most would have said the dolphin sequences would be next to impossible to shoot in the open ocean. Our experience now allows us to execute anything in a seamless manner; both in-camera and on-location. The trick is not to do it all at once."

DeLespinois' equipment package included Arri III, Aaton and Photosonics 4ML35 cameras, a set of primes, a Cooke 10:1, an Angenieux 10:1, and Nikon 600-800mm lenses in addition to complete set of filters.

The complexity of the shoot prompted the cinematographer to solicit assistance from Bob Steadman, a veteran action cinematographer with whom he has collaborated on more than a dozen commercials. "Pierre and I would shoot side by side out in the open ocean and get the master wide and close-up shots simultaneously," says Steadman. "To keep everything in focus as long as we could when we were using the 600mm lens, we relied on the Preston Light Ranger. Sometimes we would be up to one-half mile apart. I would be in the helicopter using a Tyler mount and Pierre would be down on the boat."

DeLespinois arranged for the sea vehicles to be shipped ahead to the location (a dolphin research institute in the Honduran resort of Anthony's Key) so the dolphins would be familiar with them before actual shooting began. He also kept the crew and number of boats to a minimum so as not to frighten the aquatic mammals. Many of the dolphins were from a Miami animal park that had gone out of business; a few more were borrowed from the U.S. Navy.

"Like any wild animals, dolphins have a period of caution and have to be acclimated to anything new in their environment," says Steadman. "As it turned out, they loved playing with the Sea-Doos and we got some great shots. It was a fun shoot, but dealing with rough water conditions and the unpredictability of the animals was a challenge. I shot hand-held with the Aaton 35 and used my body to keep it steady."

DeLespinois sank a 60' green screen into 90'of water to realize a school of dolphins soaring over the vehicle in a vista of open ocean, after hav-

ing shadowed it underwater. For some of the wetter shots, he donned scuba gear and employed a Pace Technologies underwater housing unit. "The Pace is great because you can open it and change it within a minute since the opening is cut on a diagonal, giving you complete access to the mag."

To economize the cost to the client, Crest Films arranged to get footage of the entire Sea-Doo product line simultaneously. Prior to the five days allotted for the outdoor location shoot, two days were spent on a Florida stage picking up glamour shots of nine different vehicle models.

There, Steadman put into practice a new option to the fluid head he invented in the early Seventies. "On stage we built a 360-degree turntable and used a Weaver/Steadman three-axis head," he explains. "Now, besides panning and tilting, you can roll the head 360 degrees. That, when combined with a product mounted on a 360-degree moving platform, gives you virtually unlimited angle choice."

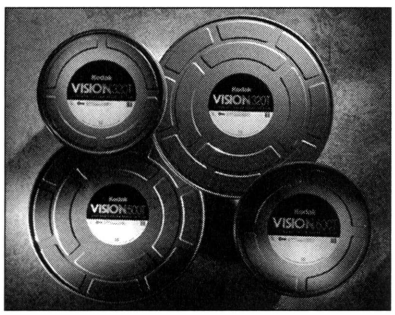
Kodak 5245 was the stock of choice for nearly the entire shoot; the Honduran location provided enough natural light for most of the high speed Photosonics work to be done with the daylight-balanced 45 as well.

By relying on a Motorola 6-channel GPS to figure sun angles, the cinematographic team shot solely with natural light at the Honduran site. "I always spend an entire day at the location before we shoot to calculate where the sun will be at any moment of the day," says deLespinois. "I then go back and look at the boards and I know exactly what position I should be in to get the best use of the natural light. Shooting wild animals in the open ocean is hard enough. I didn't want any lighting surprises."

Credits

Client: Sea-Doo
Production Company: Crest Films
Title: "Follow The Leader"
Director/cinematographer: Pierre deLespinois
Director of Photography: Bob Steadman

compiled by Andrew O. Thompson

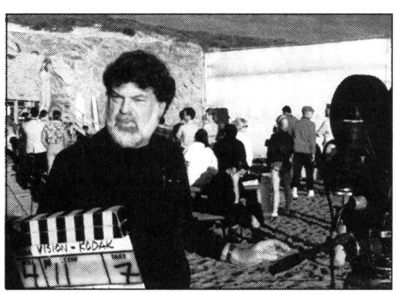


Kodak Introduces "Vision" Film Stock

Later this month, Kodak will introduce the first two members of a new family of motion picture films designed to record sharper images with a much tighter grain structure: the Vision 500T and 320T color negative films. The 500T, which is rated for an exposure index of 500 in 3200° Kelvin tungsten light, replaces the Eastman EXR 500T color negative films 5298/7298 in all formats (including 65mm, 35mm and 16mm). The 320T's exposure index is 320 in 3200°K light and replaces Eastman's EXR 200T 5287/7287.

According to Joerg D. Agin, president of Kodak's Professional Motion Imaging Division, this new line of films is based on significant advances in silver halide technology that leave film speeds uncompromised. The automated process controls in a new manufacturing plant enable Kodak to create these stocks with invariable image-capture qualities. This facility houses a highly automated film-making system based on advanced robotics and process control technologies to ensure that the film is sensitometrically invariant. The consistency of this process ensures error-free, uniform coating that eliminates the need for stock to be "mortgaged" (i.e. once it is ordered for a project, rolls from the same batch are stored for future use so as to maintain consistency in color, contrast, and other technical characteristics).

At a presentation held at the Director's Guild of America in Los Angeles on April 24, Dean Cundey, ASC showed a short demonstration film he created at the behest of Kodak as a means to put this new stock to the test. The film, entitled *A Vision of Hollywood*, included further test footage from ASC members Janusz Kaminski, Allen Daviau and Laszlo Kovacs, and commentary from members John Toll, Vilmos Zsigmond, Steven Poster, Conrad Hall, Victor Kemper and Haskell Wexler.



Dean Cundey, ASC on location testing the new film stock.

Says Cundey, "If you look at the comparisons between the old and new films, the images look much cleaner, skin tones on faces are smoother with fewer hard edges, and the pictures are sharper. There are also some interesting paradoxes. The actors look sharper, there are more details, and yet it isn't quite as hard-edged in the shadows."

Zsigmond concurs, "I think this film [Kodak Vision 500T] has incredible qualities. You can under- and overexpose it and the grain hardly changes. The grain is hardly perceptible even if you underexpose it by two stops. I think it will be wonderful for realistic night scenes when you want to make the most of available light."

For information, contact your local Eastman Kodak representative.

Toshiba Microminiature Camera

Toshiba now offers the IK-SM40A, a ¼" 410,000-pixel CCD camera. The new unit puts the latest in digital signal processing technology into a camera head just seven millimeters in diameter. With its microminiature dimensions (7mm x 42mm), outstanding low-light sensitivity (15 lux at f1.6) and versatile range of operating temperatures (14 to 104° Fahrenheit), it allows users to achieve exceptional picture quality with resolutions of up to 470 horizontal lines. The operator can select from nine pre-set electronic shutter speeds (1 to 1/10,000 second) or utilize a fully automatic shutter (to 1/50,000 second). NTSC and Y/C (S-VHS) signals are supported.

Toshiba, (800) 344-8446.

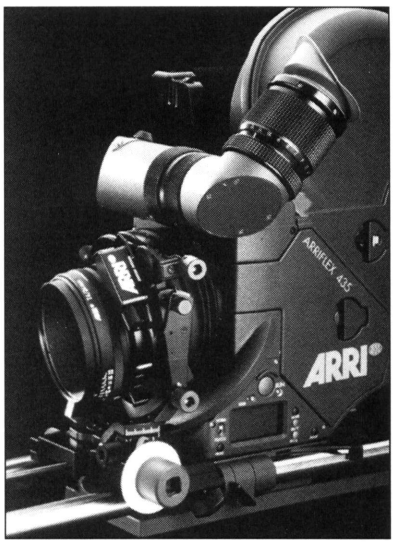
Blacklight Fixtures and Scenic Treatments

Wildfire, an L.A.-based manufacturer of blacklight equipment and fluorescent creative materials, has introduced its 401 UV Flood Fixture. This new 400-watt source projects its effect up to 175 feet, the longest throw of any UV fixture in its class. Backed by a one-year warranty, it comes complete with integral ballast, mounting bracket, safety cable, clamp and a built-in digital lamp life meter. It also features a precision quality black glass filter that cannot fade or scratch; this ensures complete safety and prevents the passage of harmful UV-B energy. Wildfire fixtures are UL, C-UL, TUV and CE listed, and meet all domestic and international needs. For its fluorescent scenic designs, Wildfire couples the "long throw" UV effects with visible and invisible paints and coatings. The scenic elements can be invisible, or partially or totally visible, when subject to standard lighting. Under UV illumination, however, these elements transform into glowing mural and scenic treatments.

Wildfire Inc., (800) 937-8065, FAX (310) 398-3831.

Arriflex Shift-and-Tilt Lenses

Arriflex's Shift-and-Tilt Lens System has gear-driven movements, indexed scales, a mechanical interface for remote control and a white disc for individual markings. With color-coded con-



trols for quick and easy adjustment, it is compatible with both 16mm and 35mm formats for both standard and macro photography and extends the field of focus, or provides alternative planes of focus, and can also achieve creative distortion or a softened image.

Arriflex c/o Media Film Service, 01-81-573-2255, FAX 01-81-756-0592.

New Fuji Stock, DATs and ATOMM Digital Technology

Fujifilm recently introduced its Fujicolor Super F-Series of color motion picture film. This series includes Fujicolor F-125/F-250 tungsten and F-64D/F-250D daylight-balanced type color negative film. Another addition to the Super F-Series, Fujicolor Positive Film FCP, is a color print film with photographic and physical characteristics that dispense with the need for a conventional black backing. Its rich, realistic gradation produces lifelike, natural images. Expanded exposure latitude produces reliable performance under varied conditions, while anti-scratch, anti-static and camera behavior properties are enhanced by a black resin backing on the film base. These stocks also offer compatibility with intermediate film for special effects work. The Super F-Series features an extended storage life, and processed films can be preserved for up to a century.

Fujifilm also announced its latest addition to the Super F-Series, Fuji Color Intermediate Film, a high-definition, ultra-fine-grain intermediate stock designed to preserve all the color and gradation of the original negative. Intended for optical work, FCI can also be used to create impressive wipes, fades, dissolves and title effects.

As with all of the films in the Super-F Series line, Fujifilm's improved FCI is composed of three emulsion layers, respectively sensitive to red, green and blue light in addition to a protective layer, a yellow filter layer, and an anti-halation layer all coated on a clear safety base. The speed balance of all the emulsion layers is designed to provide optimum results when making prints from color-mask incorporated color negative or other color-duplicating films. This color-mask image plays an important role in making color release prints. Expanded exposure latitude produces reliable performance under varied conditions, while anti-scratch, anti-static and surface lubrication properties are enhanced by a black resin backing on the film base.

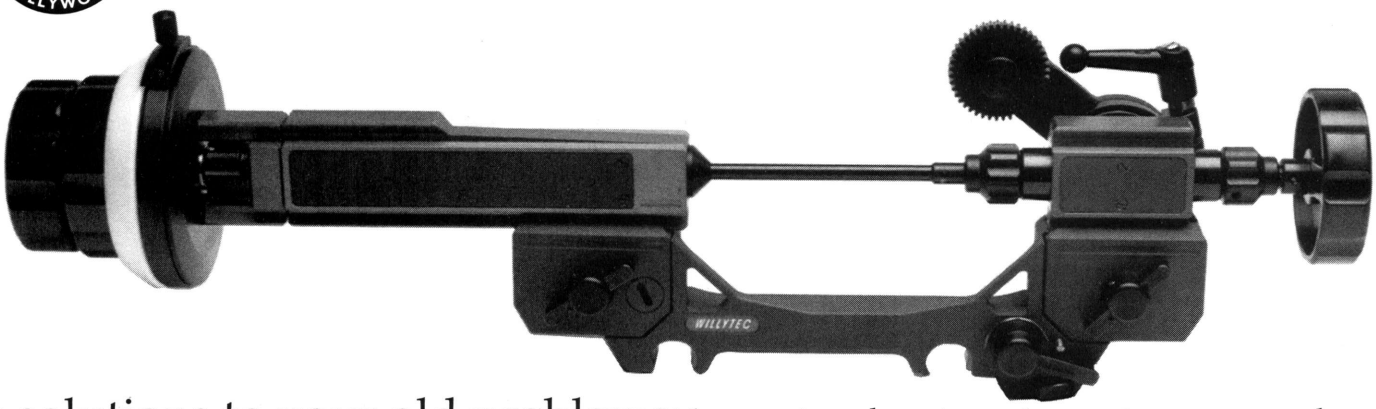
Fujifilm offers the added advantage of a machine-readable coding system on its 35mm color negative and 35mm color intermediate stocks. Called

"Mr. Code," the system uses a machine-readable bar code at the edge of the film, in addition to human-readable key numbers. Bar-code scanners connected to synchronizers, telecines and other postproduction equipment can then automate processes such as locating specific negative frames, identifying film types and other time-consuming tasks subject to human error. The FCI is available in both triacetate and polyester base in 65mm (Type 8702 TAC/Type 4702 PET); 35mm (Type 8502 TAC/4502 PET); and in 16mm (Type 8602 TAC).

Fuji's new line of professional DAT cassettes offer higher output and a lower block error rate than previous DAT tapes. These cassettes feature specially-formulated Super-Fine METALLIX magnetic particles that handle the full range of signals from ATF to PCM, while an extra-smooth tape base and advanced calendaring techniques significantly reduce errors caused by spacing loss. Recording times have been extended to

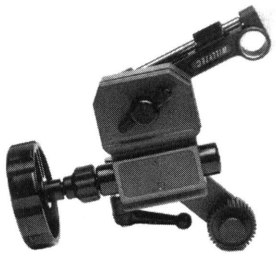
Willytec: The Ultimate Follow-Focus System.

Experience it at Show-Biz Expo Booth # 1534



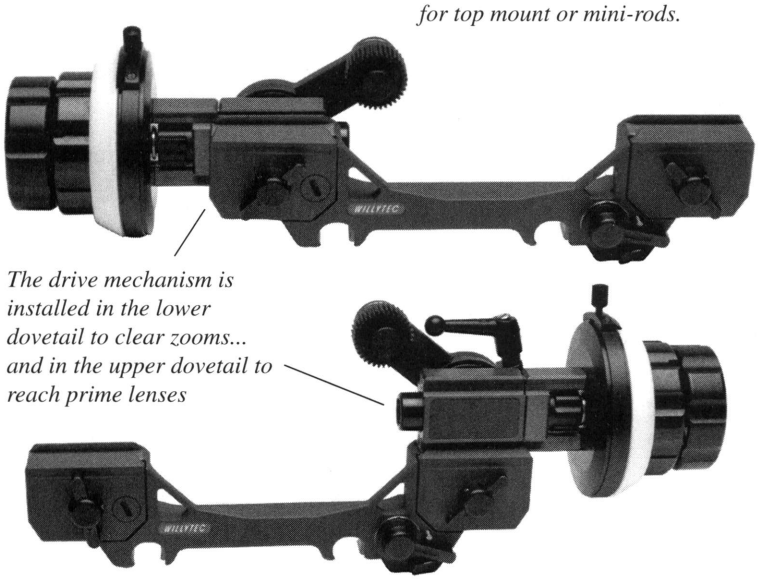
Easy solutions to your old problems: large mirror housings obstructing access to the primes, large front diameter zooms and anamorphics with focus gears difficult to access, Nikon with reverse focus direction, excessive backlash, separate systems to enable handheld use...
Name the problem, Willytec has solved it.

Modularity: is the key to this new system. The **Zero backlash follow-focus** drive mechanism combined with the handheld bracket becomes a **lightweight handheld follow-focus**.
On a **snap-on bridge** it becomes **a full studio system**.



Handheld configuration for top mount or mini-rods.

Perfect Mate: Two features to insure perfect mating to the lens.
1. The **gear arm rotates 360 degree**: it engages the focus gear and drives smoothly in any position.
2. **Bridge designed with four dovetails** (an upper and lower on either side): the drive mechanism slides in and out to get closer to or away from the lens.
It features a **built-in reverse direction** for Nikon lenses.



The drive mechanism is installed in the lower dovetail to clear zooms... and in the upper dovetail to reach prime lenses

Operator friendly: Two knob types: **handheld knob** and **deluxe 2-speed knob**.
The 2-speed knob offers **2 speeds, always readily available**. The focus-puller can, in a single move, start on the faster speed and finish on the slower speed. The 2-speed deluxe knob features a **conical marking disc** that allows clear off-axis viewing.
The **knob extension** provides clearance for large studio matteboxes.
When using physically long lenses such as the 150-600mm zoom, the **right-angle attachment** for the drive mechanism will enable the operator to comfortably look through the viewfinder while pulling focus without stretching their arm to reach the knob.

BIRNS & SAWYER, INC
1026 N. Highland Ave. Hollywood, CA. 90038
(213) 466-8211 Fax: (213) 466-7049

meet the demands of audio professionals. The line-up includes 15-, 34-, 48-, 64-, 94- and 124-minute cassettes. Newly-developed precision cassette shells are equipped with anti-static lids to protect the tape from dust and other contaminants, while innovative rib guides in the hub stopper provide a positive locking action that holds hubs securely during transportation and storage.

Fuji has also recently developed the second generation of its ATOMM (Advanced Super Thin Layer and High Output Metal Media) tape technology. It offers two main advances over the original technique: particle size has been more than halved, and magnetic energy particle size has been reduced by more than 70% through the use of newly-developed ultra-fine particles and high-energy metal. In addition, metal tape can be coated with an ultra-thin magnetic layer. The first product to be introduced using the new technology will be a videotape compatible with the DVC-PRO broadcast-use digital video system developed by Matsushita Electric Industrial Co., Inc.

Fuji Photo Film, (212) 768-0550; (800) 326-0800.

Chimera Fabric Grids and Reflector Panels

Colorado-based Chimera Photographic Lighting's portable fabric grids (egg crates) are a lightweight, compact alternative to aluminum honeycomb grids. In comparison to Chimera's existing light-control devices, these grids offer an angle of light dispersion of 80 degrees from cutoff to cutoff. The coverage is a little wider than the company's standard 60-degree aluminum grid. Fabric grids can be used with all Chimera Lightbanks which have full Velcro in the front recess. (New Video Pro, Daylite, Quartz and Super Pro Lightbanks will be made this way.) Retrofitting old Lightbanks with additional pile Velcro is possible. Chimera will offer a do-it-yourself kit or an in-house service with a turnaround time of approximately two weeks.

Chimera also has a new line of quality reflector panels consisting of a ⅝"-diameter aluminum tubing frame and five fabrics. Sizes of the shock-corded frames are 42" x 42", 42" x 72" and 72" x 72". The fabrics include three different densities of diffusion (full Chimera diffusion, ½ grid diffusion, ¼ grid diffusion) and two reflective fabrics (black/white reflector, black/silver reflector). The standard frames all collapse to a 42" length and stow in the supplied sack for ease of transportation. A compact model of the 42" x 42" frame will collapse to a stowed length of 22". This system has the Bill Holshevnikoff-designed background projection windows, which come in the following six patterns: palm leaves, window pane, venetian blinds, vertical blinds, leaves, and circuloris. These windows allow the cinematographer or videographer to add interest and mood to a scene by projecting one or more of these patterns onto the background or virtually anywhere in the image.

Chimera Photographic Lighting, (303) 444-8000; Web Site, httl:/www.chimeralighting.com; e-mail chimera@usa.net.

Filmotechnic Camera Devices

The Ukrainian company Filmotechnic is offering a new range of camera devices, including The Traveling Cascade, a 75-foot-long camera crane with a traveling carriage that moves along the boom. The device allows the camera to swiftly reach any point of the imagined 150-foot sphere crossed by the boom, along any trajectory including the rectilinear. In a swimming pool scene, for example, the camera can get a close-up of any swimmer at any point.

The three-axis gyrostabilized head installed on the Traveling Cascade ensures top precision and smoothness of picture while producing a Wescam-like effect. The main advantage of the head is its ability to stabilize the picture with any commercial movie and TV camera that weighs up to 66 pounds. The head can also be installed with a special bracket on a car, motorboat, helicopter,

or dolly camera cart to produce stable images, even with a 200mm lens.

The company's new Auto-Robot Crane stabilizes both the boom and camera with the help of the three-axis gyrostabilized head. The boom can be aimed at any point chosen by the cameraman and with a length of up to 13 feet, it can provide a 360-degree panoramic horizontal view and 45-degree vertical view. It can support a camera of up to 35 pounds installed on the gyrostabilized head and can be mounted on a car top, motorboat or any other moving support. For example, it can be mounted with vacuum grips on the roof of a moving car and used to produce images of that same vehicle, and everything going on inside it, with the help of a remote control and monitor. (See photo.) The total weight of the Auto-Robot, including the three-axis gyrostabilized head, is 264 pounds.

Filmotechnic (Anatoly Kokush, Ukraine), (044) 441-4575, FAX (044) 446-0832.

Louma, (Andy Romanoff, U.S. representative), (310) 558-7890, FAX (310) 558 - 7891.

Management Graphics Recorders and Accessories

Management Graphics, Inc. has just announced the release of its Opal Plus Convertible Film Recorder. With 8K digital imaging and an enhanced optical path, it provides medium-format users with the opportunity to maintain an image in its original format, when combined with a 120/220 film transport. The module features a motorized transport for automatic loading, unloading, and advancing. A high-quality lens and matched filter set help produce sharp images.

Opal Plus supports the full height and width of the module's 6" x 7" image area. A standard 35mm film transport accepts 12-, 24-, or 36-exposure cassettes and allows for frequent

changing of film types for negative and positive imaging.

Opal Plus images at standard 2K, 4K and 8K resolutions, and, with the increasing importance of Photo CD to desktop users, the unit is fully compatible with its standard 3K and 6K resolutions. The recorder automatically shoots Photo CD files to fill the image area without the need to interpolate or replicate the data in external software packages such as PhotoShop. It uses Digital Geometry Control (DGC), MGI's patented system that automatically manages image settings such as alignment, vignette, linearity, orthogonality, aspect ratio, dynamic focus and size. All characteristics are checked during operation so the settings do not drift.

A color-coded, push-button front panel gives users complete control over image brightness, contrast, size and position. The front panel also steers operators through common functions, including film loading and unloading. Five LEDs keep operators up to date on its current status.

MGI has also introduced its Solitaire Gemini Image Recorder, which includes many of the features of their Solitaire Cine III Image Recorder, but with an increased emphasis on negative imaging. Gemini supports numerous high-contrast film transport options including 4" x 5", 120/220 and 35mm resolutions up to 16K. For maximum throughput, it maintains the SCSI and GPIB transfer rates of the Solitaire.

Management Graphics, Inc. (612) 854-1220, FAX (612) 851 - 6159.

Funding for Boston Filmmakers and Media Artists

The non-profit Boston Film-Video Foundation (BF-VF) is awarding more than $56,000 in grants and fellowships to support Massachusetts filmmakers in their progress.

The Massachusetts Media Fellowships (MMF) are available to media artists of at least 18 years of age, have been legal residents of Massachusetts for the past three years, and who are not enrolled in a film-related degree-granting program. For merit awards, applicants must have completed at least one piece which has been shown in public. Production grants require a proposal for a new work or work-in-progress.

MMF funding is provided by the Massachusetts Cultural Council, the LEF Foundation and D-Vision, makers of digital editing systems.

Previous grant recipients include Salem Mekuria, whose documentary on Harlem Renaissance writer Dorothy West won numerous awards and was purchased later for broadcast by Boston public television station WGBH.

BF-VF, Cherie Martin, (617) 536-1540.

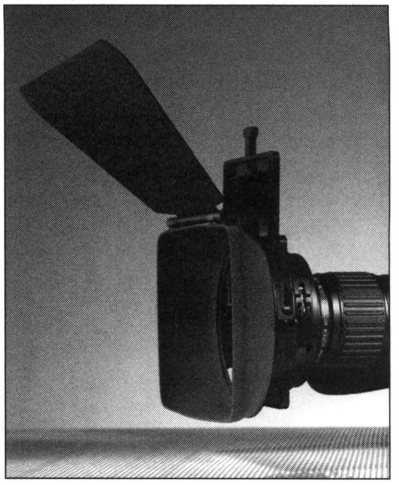
ASA Lightweight Composite Cases

ASA Productions offers lightweight cases for mixing and light consoles (from 52 to 96 channels), shock mount racks and custom road cases. These cases combine the durability of wood with the lightness of plastic; they are 65% lighter than comparable wood panels. Each 5' x 8' panel is ½" thick and constructed of a super-lightweight carbon-fiber composite. They are available in a multitude of colors, and offer Fiberglass or ABS plastic laminate finishes which can be either textured or smooth.

ASA Productions, (714) 998-5575, FAX (714) 998-5576.

ProSource Equipment

ProSource offers the California Sunbounce, a strong yet lightweight reflector/diffusion panel system that is a rugged, more practical alternative to flimsy light discs and plastic panels. The system is available in two sizes: 74" x 44" and 48" x 6" (effective panel area). Interchangeable fabric screens include a variety of reflective and diffusive materials such as silver/white, gold/white, white diffusion and an exclusive zebra pattern. The aluminum frame will not twist or collapse in windy conditions and can be supported using standard light stands and grip equipment. This frame can be disassembled in less than two minutes



and stored in its own carry bag. The large frame weighs only four pounds fully assembled.

The new Scriptboy UHF wireless time code reader can be used to transmit time code via a 418 MHz, UHF frequency. This increases the operating range to over 400 feet in the line of sight. The "clipboard" features a lighter, more durable ABS plastic writing surface with dual hold buttons for right- or left-handed users. The unit weighs 19.5 ounces, including two AA batteries. The transmitter, designed to be attached to the time code source, weighs only 1.4 ounces, including one AA battery and its integral antenna. Both transmitter and receiver will operate on their internal DC power source for over 20 hours.

In addition, the company's Shade FX is the first broadcast video Matte Box system developed for the rigors of hard news ENG and the multifaceted demands of on-location EFP. It functions with all existing internal focus lenses up to 5.2mm, including the 4:3 and 16:9 aspect ratios. The patented QL mounting system, with a selected insert adapter ring, attaches directly to the front lens barrel. Two filter compartments which accommodate 4" x 4", 4.5" x 4.5" or 4" x 5.6" filters (glass/resin) rotate simultaneously at 360 degrees. Manufactured of molded carbon fiber and machined aluminum, the complete system weighs only 18.5 ounces. It incorporates a Dynamic Balance Design which distributes its weight evenly. This eliminates stress on the lens barrel and mount when using filters.

ProSource, (203) 335-2000, FAX (203) 335-3005.

Sayles Concocts Authentic Tex-Mex Murder Mystery

by Brooke Comer

In shooting his previous films, New York-based auteur John Sayles has braved the hustle and bustle of Harlem, Louisiana's humid bayou country and the devil-may-care elements of Ireland's western coast. Sayles' latest work, *Lone Star,* evolved from the director's fascination with the unique culture, both visual and historical, of Mexican-American border towns.

He explains, "Border towns exist primarily because of commerce. The architecture isn't pretty, like the German brick buildings in Austin. Border-town architecture is about the way the signs hang. It's not Sam Peckinpah country anymore. It's Wal-Mart country."

Told in both past and present time, the mystery of *Lone Star* begins when skeletal remains unearthed in the desert re-open a 40-year-old murder case, causing tensions to run high among families on both sides of the border.

Says Sayles, "Here's a place where people lived until the 1830s, when suddenly someone drew a line, and everybody south of that line was one kind of people and everyone north was another kind. I wanted to tell a very personal story about the burden of ethnic and family history that would connect with the larger story of social history."

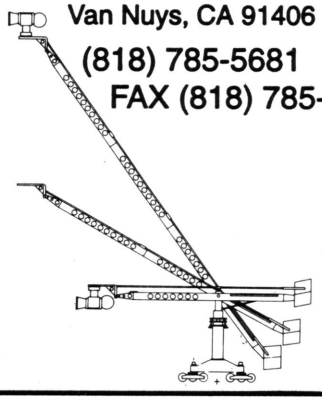
After scouting communities from El Paso to Laredo on the Texas border, the director satisfied his location needs with the town of Eagle Pass. "It's just two hours from San Antonio, it has a downtown, and you can walk across a bridge over the Rio Grande into Piedras Negras, Mexico. There are also lots of chain restaurants and signs."

To accommodate the horizontal lines of the river and the desert, Super 35 was chosen by Sayles and his cinematographer, Stuart Dryburgh, a New Zealand native who earned both an Academy and ASC Award nomination for his work on *The Piano.* After making that choice, filming became a matter of hashing over what the director calls "the philosophy of shooting." Explains Sayles, "It's something I always talk about with the cinematographer, the sound person and the composer, in order to direct the progression of the movie."

In *Lone Star,* for example, Colonel Delmore Payne (Joe Morton) is initially seen at dead center in the frame, an illustration of his sense of control and self-confidence. As Payne begins to doubt himself, "he creeps to the edge and the framing gets less balanced," says Sayles. Meanwhile Miriam Colon (Mercedes Cruz), proprietress of a local restaurant, starts out tiny, in the background of each frame. By gradually shooting her from a lower angle, Colon begins to appear stronger and more dominant. "That progression comes from a philosophy that affects every single shot," adds the director.

Three ethnic groups are represented in *Lone Star,* and Sayles brought color and design into the frame to identify and distinguish their territories. Sheriff Deeds, an Anglo clad in a beige uniform, is often seen against plain, beige walls or the flat desert. "He has nothing on those walls," says Sayles. "He's trying to erase the past and free himself from it." Colonel Payne, an African-American, is framed occasionally with the American flag behind him. His father, Otis (Ron Canada), runs a nightclub called Big O's, the walls of which are layered with posters. "This movie is so much about history that it takes more than a camera angle to make the associations," says Sayles. "You can tell from the walls of Otis' club that he never threw anything away, but just tacked something else over it."

Lone Star's flashback scenes



convey the feeling that the past is still living. To maintain the fluidity between past and present, Sayles used theatrical transitions rather than dissolves or cuts. Such atypical shifts (shooting 180 degree angles that turned into 360) include going from a day interior to a night one, or tilting down into a plate of tortillas in the present, only to pan up into 1957.

"Variable-strength lights helped, but they didn't do much good when we shot in the Rio Grande at night," says Sayles. Particularly difficult was a scene that pans from an adult Sheriff Sam Deeds (Chris Cooper) and Pilar Cruz (Elizabeth Pena) to the pair as children playing near the same river they're seen at years later. There was a drought during the shoot, and when it came time to shoot the river scene, the chosen location was four feet above water.

"We ended up finding a spot the morning of the night we shot," Sayles recalls. "It had to be very specific; the Rio Grande is a fast-moving, deep river, and we were shooting in waist-deep water, so it had to be safe. But it was hard for Stuart to preplan the specifics of lighting, and we didn't have a big package to begin with — just one big crane and a few big lights."

Though undaunted by his triple role of writer/director/editor, Sayles relied on script supervisor Mary Cybulski, "who really understands editing, which allows me to pay attention to the screen." Sayles, who works with a video assist, will come in with a list of 15 shots; if there's only time to get nine, he says, "it's good to be able to talk to Mary about which four we absolutely need and how we should then organize our time in the second part of the day."

Sayles remains uncompromising when it comes to locations, however. He intends to go for an authentic Latin flavor with his next film, *Men with Guns,* which will be in Spanish with English subtitles. "I'll definitely shoot it on location in South America. If I had a New York story, I'd shoot it in New York, I wouldn't go to Toronto. I don't like the idea of going to Toronto because the exchange rate is better. If a movie is set in New York, that's where you shoot it."

Materials and information regarding East Coast projects and events can be sent to: P.O. Box 123, New York, NY 10021.

Books in Review

by George Turner

The Maltese Falcon
edited by William Luhr
Rutgers University Press,
280 pps., hardcover $48,
paper $16.

So popular is director John Huston's 1941 version of Dashiell Hammett's great detective novel that writers continue to lavish it with considerable attention. In this compilation, editor William Luhr, author of *Raymond Chandler and Film*, has written a long and informative introduction, an accurate continuity of the film, a filmography and bibliography as well as a chapter exploring narrative technique. In the latter, Luhr attributes a great importance to the half-open window and fluttering curtain of Sam Spade's apartment, the significance of which some have found elusive. Following this analysis is "The Stuff That Dreams Are Made Of," Rudy Behlmer's excellent behind-the-scenes account of the Huston picture; contemporary reviews from America and France; and five articles from other writers.

References abound to a tale related in the novel by Sam Spade concerning a Mr. Flitcraft of Tacoma, who, after nearly being squashed by a falling beam, disappears, leaving behind a wife, two children and a substantial estate. Hired to trace Flitcraft, Spade finds him in Spokane, living the same kind of life from which he had run away. Although this yarn does not appear in any of the three movie versions, its fatalistic tone is preserved in them all.

Though emphasis is placed on the 1941 picture, it's refreshing to read non-condescending comments on the 1931 and 1936 versions, which aren't the bombs most modern writers make them out to be. It is, however, difficult to agree with Jean-Loup Bourget's opinion that the first and third versions suffer in comparison with the second *(Satan Met a Lady)*; the writer finds it not only "comparable, but very much superior, to the *Thin Man* series. . ." Well, to each his or her own.

Ilsa J. Bick's chapter, "The Beam That Fell and Other Crises in *The Maltese Falcon,*" takes a psychiatric approach that mentions "phallic" or "phallus" some 18 times. Like the film itself, this volume holds something for everybody.

The Genius of the System
by Thomas Schatz
Metropolitan, 528 pps.,
paper, $16.95

The Genius of the System, first published in 1989, and now back in print with a new preface by Stephen Bach, is evidence that primary source research is the key to historical truth. Author Schatz, a professor at the University of Texas, Austin, combed through many studio archives for production reports, schedules, conference notes, memos and cost sheets to offer an approximation of the moviemaking process from 1920 to 1950. Secondary sources were utilized to complete the picture.

Schatz focuses upon Universal, MGM, Warner Bros. and Selznick as representatives of the 30-year period during which the major studios were at their most powerful. Much is revealed about the dictators of these companies, benign and otherwise, who got and gave ulcers *en masse*, from the men in charge of the California lots to the corporation chiefs based in New York.

No one could say that the company moguls and studio executives were perfect. In fact, some of them weren't even decent. But the natural enmity between business and art didn't prevent the men behind the system from realizing the films we know and love. Says Schatz, "Studio filmmaking was less a process of collaboration than of negotiation and struggle — occasionally approaching armed conflict." This potential for insurgency notwithstanding, he makes it clear that the desired results were achieved more often than not. The

author's conclusion that "a productive, efficient and creative system was lost back in the 1950s" may offend supporters of the auteur theory, but it leaves little room for argument.

From Peepshow to Palace

by David Robinson
Columbia University Press,
227 pps., hardback, $29.50

Subtitled *The Birth of the American Film,* this new volume by British historian David Robinson is a good read that's informative and chock-full of vivid, humorous incidents. After brief coverage of some primitive experiments, a section which begins with the magic lantern, *From Peepshow to Palace* launches into the great burst of research that began in 1893 and reached a sort of maturity in 1913. Needless to say, much of this involves the creative efforts at the Edison Studio where — no matter what anybody says — *practical* moving pictures began.

The author of several books on the early days of film, including *The History of World Cinema,* Robinson makes succinct reference to the development of the American film as being "like the assembly of the pieces of a puzzle." Some of the many detours and false trails along the difficult road to this scientific and artistic miracle, along with the innovations and triumphs that made it all possible, are discussed here.

The illustrations are a mix of the wonderful and the frustrating. Among the former is a 16-page color section of early posters and frame blow-ups of hand-colored films. On the other hand, some of the interesting material from catalogs and trade magazines, reproduced as halftones, are so small and screened-down that they are illegible.

A foreword by Martin Scorsese is devoted largely to William Friese-Greene, the English inventor whose attempts to create motion pictures on flexible film predate or parallel Edison's. It must be borne in mind, however, that Edison's system worked and Friese-Greene's did not.

Though the general history in this book has been covered previously, Robinson has dug up some gems that give this version a fresh sparkle.

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Advertiser's Index

From the Clubhouse

Haskell Wexler, ASC Receives Hollywood Star

On Wednesday, February 28, 1996, Haskell Wexler, ASC became only the fourth cinematographer in history to be honored with a star on Hollywood Boulevard's Walk of Fame. The cameramen who had previously received of the Hollywood Chamber of Commerce honor were Leon Shamroy, ASC; J. Peverell Marley, ASC and Ray Rennahan, ASC. Each was one of the original 1500 artists given this distinction in 1960.

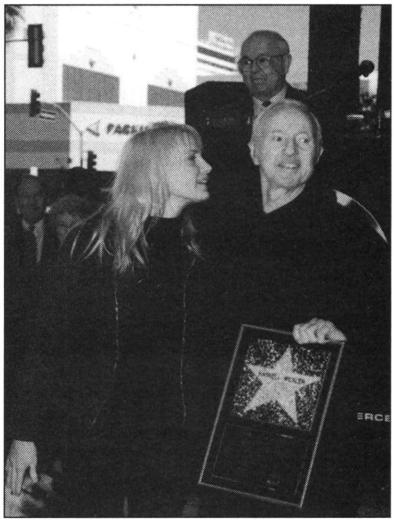
Wexler's niece, Daryl Hannah, and friend Mike Farrell were on-hand to offer words of praise. The many spectators included ASC President Victor Kemper and such ASC members as John Toll, Robert Liu, Owen Roizman, Conrad Hall, Dean Cundey, Michael Margulies, Stevan Larner and Woody Omens, who was heard to say, "It's a great day for all cinematographers." Also there were ASC International Award-winner Henri Alekan and honorary member Bud Stone.

After his star was unveiled, the applause subsided and it was Wexler's turn to speak. "This is the first star given to a director of photography in over 30 years," he began, "and I think it's in appreciation for all of our work and what we stand for. That's why I can stand here and accept all these accolades. I tell myself it's for all of us, and hopefully there will be others in the future. Thank you all for being here."

Wexler's career has spanned nearly half the history of the cinema. A native of Chicago, he moved westward as a young man to study at the University of California at Berkeley. During his freshman year, he joined the Merchant Marines as a seaman. Twice, he survived torpedo attacks as the tanker he served on ran a gauntlet of Nazi submarines in the North Sea. His luck ran out, however, and his vessel was sunk off the northern coast of Africa. Wexler drifted in a lifeboat for several weeks, and later spent a month living in native villages.

Wexler returned to Chicago with a commission as a second officer and a Silver Star. After spending several months working for his father in a stock room at Allied Radio Company, it became apparent that he wasn't a chip off the old block. His father asked him what he wanted to do. Wexler answered that he wanted to be a filmmaker.

Wexler's father financed his entry into the business by opening a studio equipped with the latest camera and lighting equipment. Wexler shot several documentaries for local unions, and then his father got him a job producing an industrial film at a cotton mill owned by a friend in Alabama. He shot a poignant film focusing on the millworker's everyday reality, but the owner of the mill



forced him to do reshoots that focused on the equipment rather than human beings. It was a defining experience for the aspiring filmmaker.

Wexler also shot commercials for Kling Studios, later named Fred Niles Studios. He was scheduled to become chief cinematographer for Niles' Los Angeles studio during the late 1950s, but there was a snag in transferring his Guild membership. In 1958, he shot his first narrative film, *Stakeout On Dope Street*, a $30,000 docu-drama directed by Irvin Kershner and produced by Roger Corman.

During that period, Wexler shot features under the pseudonyms Mark Jefferies and Phil Lewis, as he was locked out of the Los Angeles Guild. His credits included *Studs Lonigan*, *The Hoodlum Priest* (also directed by Kershner), *Angel Baby* and *A Face in the Rain* (Kershner).

Wexler's big break came in 1963, when Elia Kazan tapped him to shoot *America, America* on location in Greece and Turkey. Kazan selected Wexler out of admiration for his work in *The Hoodlum Priest*.

America, America proved to be Wexler's gateway to Hollywood. In 1964, he was finally enrolled in the Guild as an assistant cameraman. His first jobs were as fill-ins on TV series, mainly *Ozzie And Harriet*. That same year, he shot his first feature under a Guild contract, *The Best Man*, starring Henry Fonda. Wexler was preparing to shoot the Warner Bros. film *A Fine Madness*, also directed by Kershner, when he literally bumped into his Chicago acquaintance Mike Nichols. That chance meeting led to his shooting *Who's Afraid of Virginia Woolf?*

That film marked the beginning of an eclectic career. Wexler has earned fame for his feature film work, which includes Academy Awards for *Who's Afraid of Virginia Woolf?* and Hal Ashby's *Bound for Glory*, and Oscar nominations for *Matewan*, *One Flew Over the Cuckoos Nest* and *Blaze*, which earned him an ASC Award as well. His body of work also includes *Coming Home*, *The Thomas Crown Affair*, *Colors*, *In the Heat of the Night*, *Babe*, *Other People's Money*, *The Secret of Roan Inish*, *Mulholland Falls*, some 40 documentaries (his directorial collaborations with Saul Landau display Wexler's tireless social and political activism), thousands of commercials, and the occasional Imax film such as his 50-minute on-tour journey with The Rolling Stones, *At The Max*. His resumé also includes two feature directorial efforts, *Medium Cool* and *Latino*.

Wexler's artistic contributions have earned him much acclaim from peers as of late. In 1993, he became the first active cinematographer to receive an ASC Lifetime Achievement Award. Characteristic of Wexler, he chose a friend, Steadicam inventor Garrett Brown, to present the award instead of the obligatory high-profile actor or director. Later this year, Wexler will receive a Lifetime Achievement Award at CamerImage '96, The International Festival of the Art of Cinematography, in Torun, Poland. — Megan Inglesby

With stars in her eyes, actress Daryl Hannah joins her uncle for his day in the sun.

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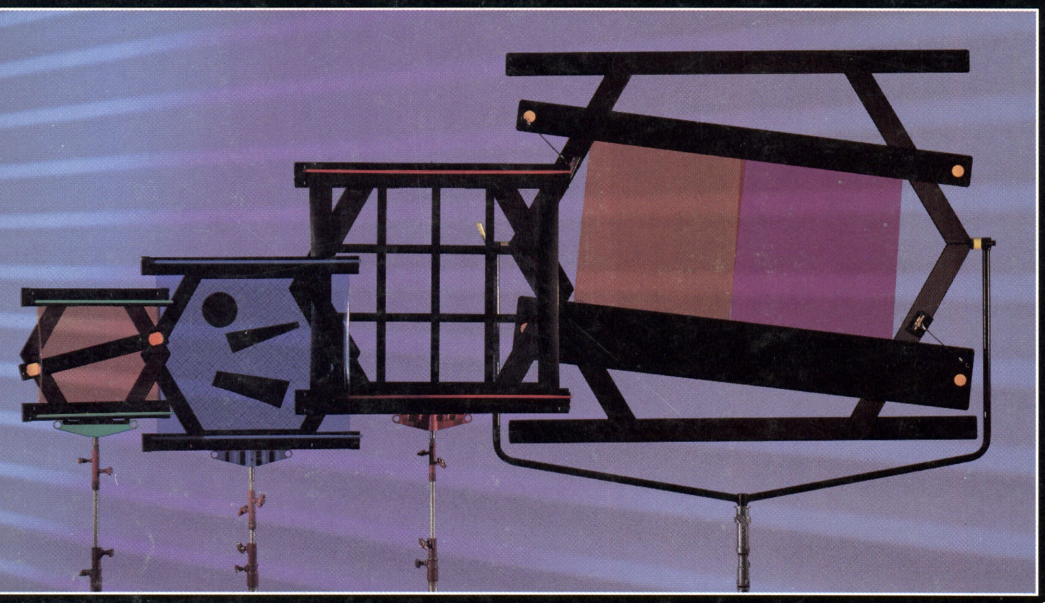

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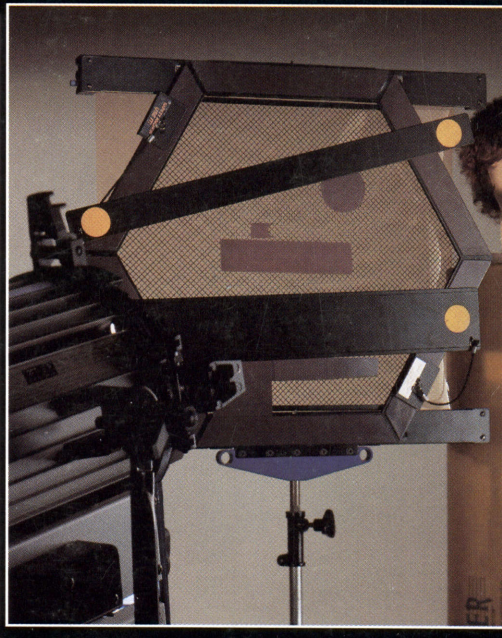

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